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Art. I.—*Bloodletting as a Therapeutic Resource in Obstetric Medicine.*[1] By Fordyce Barker, M. D., Clinical Professor of Midwifery and Diseases of Women in the Bellevue Hospital Medical College; Obstetric Physician to Bellevue Hospital, etc.

The day following my return to the city, after my summer vacation, I was called to see a young married lady, in the sixth month of her first pregnancy, whose symptoms were such that I considered bloodletting indicated. Not being yet in full professional harness, I had no lancet in my pocket, and, as the residence of my patient was nearer the surgical-instrument shop at the corner of Broadway and Thirtieth Street than it was to my house, I went there to procure a lancet, where my demand was politely answered by an expression of regret that there was no lancet in the shop. The fact that a lancet was not to be obtained in the only shop for the manufacture and sale of surgical instruments within two miles and a half of the centre of residence of the population of this great

[1] Read before the N. Y. County Medical Society, December 5, 1870.

city struck me as a most amusing and, at the same time, as a most significant commentary on the change of practice which has taken place in the profession within the last thirty years. I presume that I should be correct in saying that our predecessors, in the same class and number of cases, bled more frequently in a month, perhaps in a week, than any of us now do in a year. In all the consultations in obstetric practice, with members of the profession during the last fifteen years, I cannot recollect a single instance where bloodletting had been resorted to, or even alluded to as a therapeutic measure to be discussed, except in a few cases of puerperal convulsions. Thirty years ago, the standard authors who guided the practice of obstetrics, both in Great Britain and in America, were Denman, Clark, Burns, Hamilton, Gooch, Collins, Ryan, Conquest, Lee, Ramsbotham, Rigby, Gordon, Hay, Armstrong, Dewees, Velpeau (translated by Meigs), Francis, and Meigs. I find, from a careful examination of all these authors, that bloodletting is recommended as a therapeutic measure by one or all of them, for the following conditions, which occur during gestation, parturition, and the puerperal state. During gestation, this measure was advised by many of the above authors, and was not objected to by any, for the following symptoms; namely, uterine irritation and uterine plethora, erratic pains, cramps and numbness of the inferior extremities, spasmodic cough, palpitation, pruritus, varices, inquietude, loss of sleep, solicitude and anxiety, headache, drowsiness, vertiginous complaints, hemiplegia, anasarcous swellings of the inferior extremities, to prevent abortion, and also to promote expulsion where abortion is inevitable.[1] Velpeau quotes from Mauriceau the case of one woman who was bled from the arm eighty-six times in one pregnancy, and from De la Motte another case, in which, during the latter months of pregnancy, the woman was bled eighty-seven times, and each of the women was delivered at full term of a fine, large child.

During parturition, bloodletting was inculcated for false pains where the patient is plethoric or with a feverish disposi-

[1] Francis recommends moderate venesection for the leucorrhœa of pregnancy. Francis's Denman. New York, 1825, p. 243.

tion, for irregular uterine contractions, when the pains are feeble and the patient has feverish symptoms, for rigidity from premature escape of the waters, for extreme rigidity of the os or of the perinæum, to overcome cicatricial adhesions, to prevent abdominal inflammations, and to prevent and cure convulsions.

In the puerperal state, it was urged as the most essential part of the treatment for the arrest and cure of all of the *post-partum* inflammations; as mammitis, metritis, phlebitis, and peritonitis, and by many it was taught to be the principal therapeutic resource in phlegmasia dolens, puerperal fever, and puerperal mania.

Now, as some one of the above large catalogue of symptoms was pretty sure to occur during gestation, parturition, or the puerperal period, it came to pass that formerly a large majority of women were bled some time during the above periods. I dare say that all of us in active obstetric practice now and then meet with a jolly, vigorous grandmother, who tells us with a good deal of complacency that she has had eight, ten, or twelve children, as the case may be, and that she was bled from the arm once, and sometimes twice, "with each of her children." If my recollection be not at fault, the general sentiment of the profession brought about a reaction from what had become almost a routine in practice, long before the change was apparent in the doctrines taught by the standard obstetric authors.

It is an important question, however, to decide whether the reaction in this point of practice did not go too far. Were our predecessors all wrong, and has the recent practice been all right? For my own part, within a few years past, I find that, as my clinical experience becomes more enlarged, I am gradually getting to bleed more frequently; and this change of practice has not arisen from any belief on my part in a change of what has been termed "the constitutional type" of the diseases incidental to child-bearing. My convictions, that this resource in practice had been too much neglected by myself and others, had been progressively growing for some years, when they received a new impetus from reading a paper by one of the most original investigators and philosophical observers now living,

in England. I refer to the Introductory Address before the Medical Society of London,[1] by the President, Dr. Benjamin W. Richardson, "On Bloodletting as a Point of Scientific Practice." This paper is so full of thoughtful and practical suggestion, that I have been surprised that it has not been generally copied by the medical journals in this country. Whether the views of the author be accepted in full or not, no man in active practice can read this paper who will not find himself interested and instructed by its perusal.

I purpose in the following paper to study bloodletting as a remedy, exclusively in obstetric practice. It was in obstetrics that this measure was formerly resorted to the most frequently, and was probably carried to the greatest extreme, and perhaps it may be that now in obstetrics it receives the most unmerited neglect.

I shall endeavor to appreciate the true value of this resource, in the diseases of pregnancy, the complications of labor, and the puerperal diseases.

Diseases of Pregnancy.—The doctrine of plethora was the dominant idea thirty years ago, in explanation of many of the most striking symptoms which occur during gestation. The vertigo, the dimness of vision, ringing in the ears, sudden flushings of the face, fulness of the head with somnolence, were regarded as symptoms of cerebral congestion, the consequence of general plethora, and bloodletting was regarded as the best means of overcoming these symptoms. To Cazeaux belongs the chief merit of calling attention to the fact that the most frequent cause of those functional disorders of pregnant women, which had hitherto been attributed to plethora, was really due to an impoverished condition of the blood. No doubt, many before had noticed that the symptoms arising from hydræmia and those due to plethora were identical, and Andral had previously explained these coincidences by observing that if the mere passage of too great an amount of corpuscles through the vessels of the brain appears to account sufficiently for the cerebral disorders witnessed in plethora, it follows that too small an amount of corpuscles traversing the same vessels

[1] *The Practitioner*, edited by Francis E. Anstie, M. D., F. R. C. P. November, 1868. Macmillan & Co., London.

will produce similar disorders; so that too great or too small an amount of corpuscles deranges certain actions of the brain in the same manner. Cazeaux's views were confirmed by the general experience of the profession as to the happy effects of tonic treatment in the majority of cases. Hence it may have resulted that real plethora has been sometimes overlooked. We occasionally see those who have not been remarkable for vigorous health, and who have been accustomed to menstruate freely, exhibit a wonderful renovation of functional activity during a first pregnancy, gaining flesh rapidly, and in such, it may occur that real plethora may follow to such a degree as to jeopardize the continuance of the pregnancy if not the life of the woman. In these cases the fœtal circulation becomes oppressed in consequence of the troubles of the maternal circulation, and the appearance of the motions of the fœtus are retarded, if they have not yet been perceived, or they become weaker, diminish in frequency, and may cease altogether. That this is the result of local congestion is demonstrated by the prompt reappearance of the motions of the fœtus after the mother has been subjected to a moderate loss of blood. Even in hydræmia, there may be an excess in the quantity of the blood, a kind of serous plethora, resulting in great disturbance of the circulation, and local congestions, which will be overcome by moderate venesection, followed by a more nutritious animal diet and the use of iron and other tonics. Of these local congestions, I shall allude a little more in detail to two of the more frequent and important; namely, uterine and renal congestion.

Uterine congestions, Cazeaux remarks, and my own experience is the same, are witnessed most frequently in feeble and anæmic women. He observes, they almost always appear at the menstrual periods, as though the monthly periodicity excited at these times a more active vitality in the uterus. The woman complains of tension, of swelling of the abdomen, of a feeling of weight in the pelvis, the groins, and the upper part of the thighs. She also soon suffers pain in the region of the kidneys and in the loins. If the proper measures be not employed, the vascular congestion, and the pressure upon the uterine walls resulting from it, irritate the organ. Slight con-

tractions occur; sometimes even a little blood flows from the vulva, and announces a threatened abortion. These symptoms are almost always accompanied with marked vesical tenesmus. If these symptoms do not disappear under the use of revulsives, diuretics, and moderate catharsis, I believe bleeding to the extent of a few ounces to be most useful, followed by the use of such medicines as improve the condition of the blood, particularly the chlorate of potash and the preparations of iron.

Of renal congestions I will remark, it is only within the past thirty years that it has been understood by the profession generally that, in some cases of apparent cerebral congestion, the primary arrest of circulation commenced in the kidneys. This condition is most emphatically marked in the temporary albuminuria of pregnancy. Within a few years I have had a success in warding off the danger attending this condition which culminates in puerperal convulsions, by venesection proportioned in amount to the urgency of the symptoms, which I have never before attained by other prophylactic means. On the 15th of last month, I saw with Dr. Cheesman a lady, the mother of several children, in the eighth month of pregnancy, who was awakened early in the morning by a severe pain in her head, and almost immediately was seized with a violent convulsion, followed by two others, after a short interval in which she remained in a comatose state. I took from the arm about thirty ounces of blood; after which she recovered in a great measure her consciousness. Elaterium was then given until very free catharsis was induced. As soon as any urine could be obtained it was examined by Dr. Cheesman, and found to be loaded with albumen. During the day she subsequently had four more convulsions. Following the action of the cathartic, the citrate of potash was administered in half-drachm doses every third hour. After a few days she perfectly recovered, and all trace of albumen disappeared from the urine. At my last examination I was most happy to hear very distinctly the sounds of the fœtal heart, and at the present time gestation appears to be going on favorably in every respect.

The same day on which the case just related occurred, I saw, with Drs. Sabine, Geo. A. Peters, and McLane, a most

melancholy but instructive case; a primipara in uræmic coma, a few hours after delivery. Two or three days before labor came on, she began to complain of fixed pain at the fundus uteri, which was not accompanied by uterine contractions, and which did not yield to the measures which had been resorted to for relief. The labor was not marked by any very peculiar symptoms, except that the patient was feeble, and delivery was delayed, so that it was deemed best to terminate it by the use of the forceps, when a dead child was delivered. There was no unusual hæmorrhage following the removal of the placenta, but an old clot, as large as a man's hand, was found attached to its uterine surface, with several apoplectic deposits in its substance. There had been no external hæmorrhage previous to the delivery, and no unusual loss of blood followed. After the delivery, she remained very feeble, gradually became comatose, and died within three hours after I saw her. Very little urine could be drawn from the bladder, and the little that was obtained was found to be highly albuminous. No symptoms leading to a suspicion of renal complication had presented themselves to her attending physician previous to her final sickness. In this case it would seem as if Nature had made an unsuccessful attempt to relieve local congestion and to supplement defective action of the kidneys by bleeding. It is probable that the severe pain at the fundus of the uterus, which occurred before uterine contractions came on, was due to the effusion of blood between the uterus and the placenta.

It has seemed to me that there is some liability to err in the neglect of bloodletting, from the feeling that this measure should never be resorted to unless the patient is in a sthenic condition. But some of the most striking instances of its usefulness have occurred under my observation where the patient was extremely anæmic. In 1851, I was called to see a lady near the end of her first pregnancy. She was sitting in a chair, breathing with the greatest difficulty; her emaciated face was livid, and covered with large drops of perspiration, and the action of the heart was most tumultuous and labored. The danger of immediate death seemed so imminent, that I did not stop to make any further examination, but as speedily

as possible I opened a vein in her arm. While anxiously watching the effect of the bleeding, with my back to the door, I heard no step entering the room, until the well-known raucous voice of her attending physician gave me the encouraging salutation of, "Well done, good and faithful servant," and Dr. Francis stood by my side. After taking away about sixteen ounces of blood, the patient was relieved of all of her distressing symptoms. Dr. Francis subsequently told me that she remained perfectly comfortable for two days after this attack, when labor came on suddenly. While he was calling upon her, and just as she answered that she was very well, the membranes ruptured, and she discharged the most enormous quantity of waters that he had ever witnessed. To quote his own words, "She must have discharged a tubful, Sir, for the room was flooded." She was soon delivered, without much pain, of a dead hydrocephalic fœtus. It is my belief that if the pulmonary œdema and accumulation of blood in the right cavities of the heart had not at once been relieved by the abstraction of blood, this lady would have died.

Parturition.—Bloodletting is now rarely used as a means of removing the various causes which retard delivery. In the warm douche, belladonna, and chloroform, we have more efficient means of overcoming rigidity of the soft tissues than can be secured by venesection. It is chiefly in cases of threatened or developed convulsions during labor that it becomes a remedy of the greatest importance. It is probable that formerly, when the pathology of this fearful complication of labor was imperfectly understood, this agent was used too indiscriminately, and sometimes pushed too far. In these cases, the result to be secured should be clearly defined. The object of the bloodletting is to cure the spinal disturbance, and to prevent the cerebral disease which terminates in apoplexy. It is a means of the greatest value.

1. Where there is great fulness of the vascular system, as it then becomes a powerful sedative of spinal action. As I remarked in another paper,[1] where convulsions are threatened, or result from stimulation of the spinal system by excess of

[1] Treatment of Puerperal Convulsions. Transactions of the New York Academy of Medicine, December 5, 1855, vol. i., p. 281.

blood or mechanical pressure of blood on portions of the brain, or from counter-pressure of the distended brain upon the medulla oblongata, bloodletting alone is often sufficient to subdue the disease, while it is equally important in preserving the brain from injury due to the convulsion.

2. It is of cardinal importance, where convulsions are threatened or result from uræmia. I fully concur with Dr. Richardson's views, that in cases of uræmic poisoning, when the coma is fully developed, the patient is unconscious, the skin hot, the convulsion strong, and the suppression of urine nearly perfect, there is no remedy so swift, so sure, so useful, as the lancet. To blister, to purge in such cases, is trifling with death. To bleed is to remove tension from the brain, to relieve congestion of lung and set the breathing free, to remove pressure from the laboring heart, and to ease the congested kidney of the load that embarrasses it. These are great points gained, but there is another greater, when we take away blood charged with the active narcotic poison, urea, we for the moment actually supplement the kidney, and do its office. Dr. Richardson says that experiments have shown that of two animals, each with the function of one kidney suppressed, one will die if left alone, while the other will recover, if, when the coma and convulsion of uræmia appear, there be abstraction of blood.

Puerperal Diseases.—As regards the *post-partum* inflammations, I would remark that the whole doctrine of inflammation is now in a transition state of doubt. Many points in regard to the real nature of inflammation are still unsettled. The therapeutic indications are to prevent, or to arrest the progress, or to remove the results, of the inflammatory process. That bloodletting, in certain conditions of the system, may be of service in fulfilling one or all of these indications, is, I presume, even now generally believed by the profession. But its exact value in the treatment of inflammation is by no means determined. We have learned that we have other expedients more safe and quite as efficient. I have not for many years resorted to venesection in the treatment of any of the *post-partum* inflammations, although I have sometimes doubted whether I have not been wrong in neglecting it. I often

recall one case with a pang of regret. In December, 1859, I attended a very beautiful and interesting lady in Brooklyn, in her first confinement. During her pregnancy she was in excellent health, but gained greatly in flesh, with so much appearance of vascular fulness that, by my advice, she abstained from meat during the last four weeks of gestation. Her labor was severe and long, but terminated happily by the use of the forceps, with the birth of a living girl. The fourth day after confinement she was attacked by metro-peritonitis of a most acute and severe type. A violent delirium came on. The urine, which before had shown no trace of albumen, now became highly albuminous,[1] and the secretion of urine very scanty, and, although I had the valuable assistance of my friend, Dr. Horatio S. Smith, of Brooklyn, the case terminated fatally, I think the twelfth day after confinement. In reflecting on this case, I have often deeply regretted that I had not bled this patient either before her confinement or when the attack of metro-peritonitis came on, as she lost very little blood during labor.

I have often asked myself whether, from our fear of *post-partum* hæmorrhage, we may not have sometimes carried too far our precautionary measures to secure the immediate and permanent contractions of the uterus. I remember, some years ago, that I was forcibly impressed by an incidental remark on this point by my friend, Dr. Peaslee. In reporting and commenting on a case of "Amputation at Shoulder-Joint," he observes that, "in a perfectly healthy and vigorous patient as much blood should be lost at least as is constantly circulating in the limb before its removal; otherwise the patient is left in a state of actual plethora, to some extent, in consequence of the operation—a state not to be desired, certainly, where still other causes predisposing to inflammation exist." After giving his reasons for this opinion, he adds: "Nor is this principle less important in obstetrics than in surgery. The perfectly healthy (and generally (?) somewhat plethoric) parturient female should lose from one to two pounds of blood, at least, in parturition, in order to be in the best possible condition for convalescence with-

[1] *Vide* Clinical Lecture on Puerperal Convulsions, by the writer—*The Medical Record*, New York, 1868, vol. iii., p. 415.

out accidents."[1] Although I cannot approve of the above proposition as a general truth applicable to parturient women, I should accept it as true of an exceptional number. As regards bloodletting in puerperal fever, I have formally expressed my views on another occasion,[2] and the additional experience of thirteen years in Bellevue Hospital and in private practice has not materially modified my sentiments on this point.

In certain very rare forms of puerperal mania, bloodletting may be of the greatest service. A large majority of these cases are undoubtedly associated with or result from defective nutrition and nervous exhaustion. The following, however, is an exceptional case: In February, 1868, I was sent for to visit a young lady the thirteenth day after her confinement. Her puerperal convalescence had been so free from all unpleasant symptoms that I had ceased to visit her. I found her gloomy and taciturn, a very marked change from her usual temperament, complaining of nothing, and refusing to answer any questions. The nurse informed me that the first symptom, which had occurred a few hours before, was a complaint of pain in one of her breasts, and a refusal to nurse her child, which she had been very fond of doing. One breast was somewhat tumefied and evidently painful; her pulse was somewhat tense and quickened. The axillary temperature was 103° Fahr. There had been no chill. On visiting her the next morning, I found that she had not slept a moment, that she had not nursed her child, or permitted any thing to be done to her breasts, or taken one drop of drink, one mouthful of food or a particle of medicine. She was now beginning to talk wildly and rapidly, without noticing any remark that was made to her. During the day I visited her very frequently, and at each visit I found her condition becoming worse. In the night following I found her face highly flushed, her eyes red, and she had become very violent, with an astonishing display of muscular power. She would tear off her clothes, and scream

[1] Peaslee on Amputation at Shoulder-Joint—*The New York Journal of Medicine*, May, 1853, p. 304.

[2] Discussion on Puerperal Fever, before the New York Academy of Medicine. *Vide* New York Medical Journal, and the American Medical Monthly, November, 1857, and the same Journals, November, 1858.

incessantly, with a constant repetition of certain phrases, in such tones, and with such a "damnable iteration," as almost to drive every one crazy who heard her. With great difficulty her husband, her brother, and the nurse, held her, while I opened a vein in the arm. As the blood flowed, at first scattered generally around the room and on the persons of those of us about her, she gradually became more quiet, sank down on the bed, and fell into a sound sleep, while I was bandaging the arm. Nearly five hours after, she awoke, at once asked for her baby to put to the breast, and she was perfectly cured. After this, she did not have a single symptom of disease, and her convalescence was rapid. We estimated the quantity of blood taken at about fifty ounces, although so much was lost at first that we could not judge very accurately. In no case have I ever seen the effects of medical treatment so promptly and so happily curative.

I hope that, if I have not exhausted my subject, I have not exhausted your patience. It has seemed to me timely that the attention of the profession should be recalled to the effects of a remedy which has fallen greatly into disuse, but which, to quote again from Dr. Richardson, is one of the most scientific we have at our command, and one which produces effects as patent to the eye, and convincing to the reason, as any known remedial measure.

ART. II.—*Abstract of Virchow's Lectures on Morbid Tumors.* By ALBERT H. BUCK, M. D., and FRANCIS DELAFIELD, M. D., New-York City.

LECTURE I.

CLASSIFICATION OF TUMORS.

THE classification of tumors is still a matter under discussion, although, scientifically, I believe there can be but one side to the question. Like other products of Nature, they should be judged according to their mode of growth and individual characteristics. The importance of their relation either to the whole body or to its individual parts should occupy only a secondary place in the investigation In the science of

botany no one will doubt the great importance of distinguishing which plants are useful and which are poisonous; but, scientifically, it would be a defective method of arrangement to determine the classification of a botanical system according to these two attributes. It is a well-known fact that in the same class—in the same genus—of plants some are useful and others are poisonous; that even in the same plant one portion may be poisonous, while another is useful. In such a case, we would be at a loss how to classify the plant. It is not customary to set in one class all animals of prey, but to place those that belong to the mammalia among the mammalia, the birds among the birds, the fishes among the fishes, etc. The same holds true of tumors.

As neither chemistry nor physiology has thrown much light on the nature and origin of tumors, we must make our classification on an anatomical basis. Until the early part of this century the study of the anatomical peculiarities of tumors was restricted to a very few points. The external appearance and form, the consistency or degree of resistance offered to the pressure of the finger, were the chief characteristics to which any consideration was given. In the female breast, for instance, a hard body is often found around which the blood-vessels arrange themselves in the form of radii, like the feet of a crab. This appearance alone determined the choice of the name *cancer*. But now it is known that many tumors that are not cancerous present a similar external appearance. In the same way the term *scirrhus* was applied to very hard tumors, and *steatoma* to those less hard, in both cases without any reference to the real nature of the growth. What the ancients called a *steatoma uteri* is something entirely different from what they called a *steatoma nervi*. The term scirrhus has at different times been used for such a variety of tumors that its restriction now to a certain form of carcinoma must be looked upon as an evidence of progress. Formerly *scirrhus* was one special form of growth and *colloid* another; to-day we speak of a scirrhous cancer and of a colloid cancer.

The scientific study of the finer elements not only of tumors but also of normal tissues was first begun by Johannes Müller and Schwann. Since then our knowledge in this department

has steadily advanced, and at the present time we may consider it as so far settled that a classification of tumors on an anatomical basis is possible.

LECTURE II.

HOMOLOGY AND HETEROLOGY OF TUMORS.

It was thought, during the early part of this century, that by the aid of chemistry we should find some specific substance characteristic of malignant tumors. Although celebrated chemists, like Thénard, Vauquelin, and Lassaigne, were engaged in this labor, they could discover no such specific substance. It was finally concluded that the more malignant the tumor, the more albumen should it contain. Even so great a man as Carl Rokitansky adopted the theory that the kakoplastic material was to be sought for in the albumen.

At a later date it was expected that the microscopist would detect special histological elements, characteristic of these destructive tumors: he was to find nothing less reliable than specific cancer-cells, specific sarcoma-cells, or specific tubercle-cells. By aid of these specific histological elements the heteroplastic tumors were to be separated from the homœoplastic. For a time it was the fashion to believe that caudate cells were the specific elements of true cancer. This belief, I am certain, was not originated by any writer on histology; it was rather a dogma which grew up among the mass of practitioners, and from them found its way into the science of pathology. Once established there, it was found a very difficult matter to get rid of it. As the cancers of the zoölogists have tails, so, it was thought, the cancers of the pathologists should be characterized by similar appendages.

Every tumor is a portion of the body; it is not simply connected with the body, but is an integral part of it, being subject to its laws. Every kind of tumor-formation agrees in all material points with the typical formations known in the body. The real difference between the different forms of tumors lies in this: that tissues, which in themselves are perfectly normal, develop into tumors at one time in localities

where the tissue exists normally; at another, in places where it does not normally belong. The first is called *homology;* the last, *heterology.* The growth of epidermis in the brain, or of hairs in the stomach or urinary bladder, are instances of heterology. The hair may be precisely like the hair found in places where it grows normally, and the epidermis exactly like any epidermis-layer of the skin, and yet their occurrence in such localities constitutes an extreme instance of heterology. In my opinion, we are not to say that all tumors which consist of certain tissues are *homœoplastic*, and all that consist of certain other tissues are *heteroplastic;* but rather that the same kind of tumor may be, according to circumstances, either *homologous* or *heterologous.* A tumor may occur at one time in a locality where it represents nothing more than an excessive development of the tissue which belongs normally to that spot; at another, it will appear at a spot where that tissue does not belong at all, and forms then an entirely morbid product. To mention a special instance, cartilage may assume the form of a tumor. The enchondroma is homologous, not because it consists of cartilage, but simply because it is developed from cartilage. An enchondroma springing from the costal cartilage is, therefore, homologous; but an enchondroma of the testicle, where cartilage does not normally belong, is heterologous.

In a general way we can say that the homologous tumors correspond to what are termed *benign* growths. In the same way we can speak of the heterologous tumors as *malignant* growths, though here we must bear in mind that there is a scale of malignancy, some heterologous tumors being so slightly malignant that they may be placed among the benign growths.

LECTURE III.

GENERAL PHYSIOLOGY OF TUMORS.

If in a certain part of the body there exists a morbid tumor, whose growth is rapid, it is evident that it will not only take from the blood certain elements for its own nourishment, but that it will also return to the circulation large quan-

tities of the material which forms the product of its own metamorphosis. This return circulation takes place partly through the lymph-vessels and partly through the veins. If the return takes place by way of the lymph-vessels—and we know, from the investigations of Schröder van der Kolk, that even in cancer there are numerous lymph-vessels—it will in most parts of the body enter first the lymph-glands. Here these vessels cease to exist as regular canals, and only assume that shape again at the point where they leave the gland. In a large number of cases it can be verified that material is thus transported from tumors. Those glands which are the first to receive the lymph-vessels coming from the tumor are likewise the first to become the seat of a new manifestation of the disease. It would be absurd to explain the disease of the lymph-glands as the result of a constitutional dyscrasia. A woman, for instance, has a tumor mammæ which has perhaps existed for months. As the tumor begins to grow more rapidly, she notices a swelling of the axillary glands. After a certain time the swelling increases. Those glands in the immediate neighborhood of the breast are the first to become affected; then come those next in order, and, if the person should chance to die, we would find that the disease had been progressing inward *gradatim*, through the entire series of lymphatic glands. The only supposition we can make, then, is that some material substance is received into the lymphatic vessels from the spot first diseased, and by them is carried to the lymphatic gland first in order. This true metastasis causes the gland also to become diseased, and from here it passes to the next, and so on. Finally, in some cases it will occur that the lymph-vessels going out from the affected gland will not again enter other glands, but will pour their lymph directly into the common channel of the circulation. In this way the morbid material enters into the blood, giving rise necessarily to a dyscrasia.

It is much more difficult to prove the transmission of the morbid material by way of the veins. We know that veins are frequently found coming out from tumors, and that it is not altogether a rarity to find the mass of the tumor actually growing into the vein, so as to come into immediate contact

with the current of the blood; we know also that the tumor may project into the calibre of the vessel in the form of excrescences. It is very likely that, under such circumstances, elements of the tumor enter into the circulation, either particles of the tissue, perhaps cells, or simply fluid secretions. Metastasis probably takes place in this way in those cases where, a tumor having existed for some time in a certain spot, the organ next to it, in the order of the circulation, assumes the same form of disease. If a malignant tumor is seated in any organ in the abdominal cavity, whose veins pour their contents into the vena porta, the liver will be the first organ to come in contact with any noxious elements that may enter the circulation from the seat of disease. In point of fact, the liver is the first organ to become secondarily affected in all malignant diseases having their seat within the circuit of the vena porta. Such experiences stamp the original tumor with the character of being preëminently a focus of infection, from which certain injurious materials are sent forth to other parts of the body.

Many argue thus: After extirpating a tumor I find that others spring up, either in the neighborhood or at more remote points; hence I infer that the second growth is independent of the first, and is simply a manifestation of the same blood infection or diathesis which caused the appearance of the first tumor. We know now, however, that, at the time when a tumor is extirpated, other parts are often already diseased, although not so far modified in form or appearance as to be appreciated by the surgeon. He believes he has removed every trace of the tumor, and that nothing but healthy tissue remains; but, if the part were examined more accurately, it would be found that the neighborhood was already diseased. Schröder van der Kolk, in an admirable manner, shows to what extent the tissues in the neighborhood of a tumor may be diseased without presenting any abnormal features to the naked eye.[1]

Again, we will suppose that the tumor has been thoroughly extirpated, no traces whatever being left of diseased tissue in the neighborhood. The nearest lymphatic glands are felt of,.

[1] Nederl., Lancet, 1853–1854. Bl. 129.

and perhaps found to be a trifle swollen, but not more so, however, than would be expected in the neighborhood of any source of irritation. They are consequently not removed. After a time they begin to increase in size, and eventually grow to be as large as or even larger than the original tumor. In such a case we would hardly draw the conclusion that the dyscrasia, which caused the original outgrowth, had, after the removal of this its first eruption, chosen as it were by chance that particular set of glands. On the contrary, we are obliged to infer that at the time the first tumor was extirpated the glands in question were already tainted with the same disease, and that their development as a morbid growth would have gone on just the same whether the first tumor had been left alone or removed. The same thing often takes place in the internal organs. I operate on an external tumor and a short time afterward the patient dies. At the necropsy similar tumors are found in the lungs, the liver, and the kidneys. It would not do here to assume that these tumors, of whose existence I had not had the slightest suspicion at the time of the operation, had developed after and as a result of the extirpation. In all these cases it is much more natural, much more reasonable, and more in harmony with what we know of physiology and anatomy, to assume that, at the time of the operation, these secondary growths already existed, though in so small a form as not to create any functional disturbance; and that a certain length of time was requisite before they could grow to such a size as to create an appreciable disturbance.

For these reasons I do not consider the reappearance of a morbid growth at the spot where the original tumor was extirpated, or the appearance of similar tumors in remote organs —what is commonly called in the present day *generalization* —as occurrences which should be regarded as independent of the first tumor, or as the simple manifestation in these organs of a *dyscrasia*.

The growth of a tumor takes place after this wise: The first small nodule, or, as I shall call it, the *mother-nodule*, grows to a certain size and then stops. In the mean time a zone of new nodules is developed in the neighborhood. These, in their turn, grow until they coalesce with one another and with the

original mass. Then a second zone is formed; and here I will call especial attention to the fact that the accessory nodules are not always in immediate connection with the original mass, but that often a certain distance, occupied by normal tissue, separates the two. This mode of growth, by the formation of new foci, shows beyond a doubt that, from the mother-nodule, a certain excitement or irritation is communicated to the neighborhood, whereby it also is caused to assume an analogous form of disease. Observation, in fact, has shown that the accessory nodules develop from a proliferation of the elementary tissues of the neighborhood, and not, as has been supposed uutil recently, from an exudation or exuded blastema. The occurrence of such an excitement in the midst of firm tissues can hardly be imagined, unless we suppose it to be produced by the presence of fluids, which have found their way to the part by the process of imbibition, and there produced the excitement. This imbibition of infectious fluids takes place, I think, through the anastomosing connective-tissue elements. The process resembles that which occurs in the propagation of many forms of inflammation. Take erysipelas, for an example: The inflammation creeps from one spot to another, and we can scarcely resist the belief that the diseased condition of the spot most recently affected is the direct result of the previous disease in the spot just next to it. The "plaques muqueuses" are another example of the same kind. In many cases also of tumor-formation we are compelled to adopt the same principle of infection. The malignant juice, or humor, which is produced in the affected part, finds its way into the neighborhood, and there, acting as an excitant to the same kind of new growth, calls into existence a new nodule.

In my opinion, the study of the local increase of tumors affords the very best proofs of the infectious nature of the materials produced by them; and the formation of new nodules, or what is termed the growth of the tumor, is precisely the same thing to my mind as the disease of the lymphatic glands or of more remote organs in the course of the *generalization*. In all three cases the same process takes place: an infectious substance, or "miasma," spreads to the neighborhood from the first or parent growth, partly by way of direct imbibition

(endosmosis), partly by way of the lymph-vessels, and partly through the veins.

LECTURE IV.

ETIOLOGY OF NEOPLASTIC TUMORS.

The distinctive marks, which are believed to characterize the heterology of a tumor, are the following:

1. The *local progression*, the growth by the formation of new accessory foci in the neighborhood of the mother-nodule, and the phagedenic character which the tumor assumes when it becomes ulcerated.
2. The *recurrence in loco* after extirpation.
3. The *disease of the lymphatic glands.*
4. The *generalization*, or the formation of metastatic foci in remote organs.

All these characteristics, as we have seen, may be more naturally attributed to a secondary infection than to an original dyscrasia. But, if the formation of daughter-nodules can be thus explained on the supposition of a secondary infection, it still remains doubtful whether or not we are to attribute the appearance of the mother-nodule to a primary dyscrasia. The cachexia, the poor aspect of the patient, is often referred to as indicative of a constitutional poisoning; but it is an undoubted fact that in some cases of the most malignant form of tumor, there is not the slightest appearance of any thing like cachexia. Again, if we examine more carefully those cases where cachexia exists, we shall find that, in a majority of them, the cachexia has been the result of the local morbid growth, which has either appropriated to itself much of the material destined for the nutrition of the body, or has been accompanied by hæmorrhages, by copious fluid discharges, or by a condition of putridity. Such a cachexia has nothing specifically cancerous about it, but is the same as that accompanying any ordinary non-specific ulcerating process. At the same time it would be very rash to say that the condition of the mass of the fluids in the body had nothing whatever to do with the origin of tumors, that their appearance could always be explained by local changes. This is certainly not the view that I would

wish to convey. It is a well-known fact that, by means of a general disturbance in the nutrition of the body, certain *predispositions* are developed, and that, on account of these general disturbances, certain organs become more liable to certain diseases. But it makes a great difference whether we consider these conditions of dyscrasia and disturbance of nutrition as a *predisposing cause*, or as the immediate *causa essentialis*.

Compared with the humoral pathological doctrines, the neuropathological have never gained much ground. A few authors speak of depressing moral influences, such as care and anxiety, as having originated the formation of tumors, but the reasons which they adduce are in the main very weak.

If, therefore, the origin of tumors is neither to be found in the blood nor in the nervous apparatus, we naturally turn to the tissues themselves for an explanation. And here we should mention a fact of the greatest importance in the history of tumors, namely, the *local predisposition* to such formations. This predisposition may undoubtedly be transmitted from parent to child. It may manifest itself at so early a period that a tumor will already be found at the time of birth. This applies chiefly to a group of smaller tumors, called nævi. Again, the predisposition may manifest itself either soon after birth or at a later period of life. Perhaps thirty years, or more, will go by before the disease makes its appearance. To this category belong the hereditary tumors of the mammary gland, uterus, skin, stomach, lymphatic glands, and lungs. Tuberculosis, scrofulosis, leprosy, melanosis, cancer, and cancroid, all afford examples of this. In these instances it is undoubtedly the predisposition that is inherited and not the disease; for if the disease were inherited, we certainly would be able at an earlier date to discover some trace of it. The fact is, however, that it does not manifest itself until after a certain period of life has been accomplished; as, for example, in women at the periods of sexual life, at the commencement of menstruation or of child-bearing, or during the climacteric years. In these cases we are obliged to infer that the tissues, which make up a certain part of the body, are not able, after being exposed to certain disturbing influences and undergoing certain changes, to recover completely their regular status.

Such an *incompleteness* of the tissues can also be brought on by disease, especially where the latter is accompanied by great disturbances of nutrition. In the natural course of things an advanced age brings with it an increasing modification of the tissues. The great prevalence of cancroids in the second half of life illustrates this predisposition. Cicatrices sometimes become the starting-point of a tumor-formation. A cicatrix, however, consists of an incompletely formed tissue, which does not answer in its texture to the typical arrangement of the part. In the case of mucous membranes we know that tumors appear oftenest in such parts as have previously been the seat of a simple inflammatory process. From the simple inflammatory hyperplasia of a chronic catarrh polypi take their origin; and later these polypi may become the seat of a cancerous or cancroidal development. Those parts, moreover, are peculiarly liable to disease which, from their position, arrangement, or function, are often exposed to injuries. Here belong the diseases of the stomach, sexual organs, bones, and skin. The margins of the different orifices are also very liable to disease. Another characteristic instance is the frequency with which tumors originate in retained testicles. This frequency, moreover, is in exact proportion to the amount of friction and traction the testicle may have to undergo. When retained between the unyielding bands that form the walls of the abdomen, it is more often the seat of morbid tumors than when retained within the abdominal cavity, and still more so than when retained beyond the inguinal canal.

I think I have now given examples enough to show, that there is good reason why so much importance is attached to the local condition of the parts. The fact that certain organs show a decided predisposition to certain forms of disease, is another argument in favor of the doctrine of localization. If we examine in detail the different varieties of tumors, we shall find that some kinds are very seldom seen in certain organs, while, on the other hand, these same organs are the frequent seat of another kind of tumor. How are we to explain this, unless we assume that there is something in the tissue of this or that organ, or in the form of its anatomical structure, to determine the particular kind of growth which appears there?

These considerations apply especially to the primary eruption or mother-nodule, as I have termed it; for the nature of the secondary tumor is, of course, more or less dependent on the nature of the primary growth; and yet even in this case the local construction of the part seems to have some influence. Next to the lungs and liver, the kidneys are the most frequent seat of metastatic eruptions. Leucæmic tumors and tubercles, white and black sarcomata, cancroids and cancers, have a special predilection for this organ. The kidneys, however, are not more exposed to the current of infectious matter than are other glands, the female breast, for example; and yet does a cancerous or sarcomatous metastasis ever occur in the mamma? If, then, as is generally believed, the female breast is so sensitive to the cancerous dyscrasia, why should it be sensitive only to the primary dyscrasia, and not to the secondary? Or, if we take the testicles for an example, why should they be so often the seat of secondary tuberculosis, and so rarely the seat of secondary carcinosis? It is evident that this difference can better be explained on the ground of a local disposition than on that of a general dyscrasia or diathesis. We can almost state it as a rule that *those organs which show a decided tendency to become primarily affected with tumors rarely become the seat of a metastasis, and vice versa.* Metastases are most frequently found in the lungs, the liver, the kidneys, and the serous membranes, and it is in these very parts that primary tumors rarely occur. The skin, the mucous membranes, the eye, the nose, and the sexual glands, are the most common seat of primary tumors, but rarely of metastases. The lymphatic glands, the brain, the muscular system, and the bones, occupy an intermediate stage between the two groups; for the lymphatic glands show a very decided tendency to metastatic, the bones to primary tumor formations, but at the same time the glands are sometimes primarily affected, while secondary eruptions often occur in the bones.

Taking all things into consideration, it seems to me *very probable* that, even in the most malignant forms of tumors, the mother-nodule does not proceed from a dyscrasia; at all events, this dyscrasia must be entirely different from that which calls into existence the metastatic nodules. Here I would

caution against the danger of confusing a simple multiplicity with metastasis. Multiplicity in tissues of the same kind simply means a more extensive manifestation of the same disposition, and, if it extends over a large portion of the body, we may speak of this disposition as a *constitutional diathesis*, but only in the solidistical sense. Hereditary leprosy and hereditary melanosis bring with them the greatest multiplicity of nodules, and yet on this account we would not be justified in considering the blood or the nervous system as the permanent carriers of the diathesis. Even in those cases where the existence of a specific dyscrasia can scarcely be doubted, as in syphilis and leucæmia, we have no right to look upon the individual eruptions as the simple result of the dyscrasia, or as (so-called) spontaneous manifestations; for, with the same dyscrasia, we see at one time one organ affected, and at another time a different organ. It is especially in syphilis that we must place importance on the local causes, whether they be of an accidental or of a predisposing nature; and the "accidentalness" of the localization is justified, as I have already shown,[1] by the accidentalness of events (a blow, a strain, or exposure to cold), or of conditions (vulnerability, the existence of a cicatrix, and perhaps hydrargyrosis.)

LECTURE V.

THE PATHOGENY OF NEOPLASTIC TUMORS.

In treating of the pathogenesis of neoplastic tumors, I shall endeavor, first of all, to give a description as clear as possible of the different steps through which a tumor is wont to pass in the course of its development.

A tumor should never be looked upon as something that, at any fixed time, is perfectly developed, or as something that presents itself with constant characteristic features; it is a thing of steady growth and transformation. Even when it finally reaches the acme of its growth, it does not remain for any length of time at this acme, but continues from that point on to undergo further transformations. The history of a tumor

[1] Virchow's Archiv, 1858, xv., pp. 256, 269, 290, 306.

presents a continuous change, much greater than that which takes place in the body as a whole, or in its individual organs. The majority of tumors are developed by active processes which have their seat in the body. These processes are accompanied either by an increased secretion or exudation, or by an actual formation, and must therefore be considered as *irritative.* The history of a tumor should, I think, begin with the verification of this stage of irritation. Now, this irritation may come from outside of the body, or it may come from within. If it come from within, there is nothing against attributing it to a dyscrasia or constitutional taint, for by dyscrasia is simply meant that some substance is contained in the blood which, acting upon certain parts of the body, excites them to activity of a certain kind. I have already attempted to show that, in the history of malignant tumors, it is much more in accordance with Nature to consider the specific dyscrasia as a secondary phenomenon, resulting from the existence of the mother-nodule. But it is necessary to mention here another experience, which has important bearings on this very question of irritation. It is usually supposed that a specific dyscrasia (that is to say, a change in the blood caused by the reception into it of a special substance), produces specific products (peculiar only to this dyscrasia), and from these specific products we argue backward, in favor of the existence of a specific dyscrasia. But, according to experience, the first supposition is false, for, in the very cases where we have the strongest reason to infer the existence of such a constitutional disturbance, the products are very often non-specific; in some instances, even, specific and non-specific products originate side by side. The most characteristic example of this is to be found in the history of syphilis. If we examine the different tumors which occur in the course of this disease, we shall find a great difference between them. A certain number are simply of a hyperplastic nature, answering completely to the mother-tissue from which they originate. The syphilitic exostosis consists of bone, like any other neoplastic bony growth. A syphilitic glandular tumor (bubo) can resemble so closely in its inner structure a simple inflamed gland, that in many cases, however exact the microscopic examination, it would

be impossible to find a characteristic difference between the two. In these cases the syphilitic tumor seems to be the product of a simple irritation, resulting in the formation of homologous tissue.

There is, however, a second group of syphilitic tumors, the gummy tumors, that differ from the type of the mother-tissue in which they are developed. No one will mistake a gummy tumor of the dura mater for a simple thickening or hyperplasia of the part; a gummy tumor of the brain will be recognized at once as something entirely different from brain-substance, or the gummy tumor of the testicle as different from a simple induration of that organ. These are all heteroplastic forms. If, therefore, from the same source, proceed homologous as well as heterologous products, we certainly dare not infer, from the nature of the individual products, what the particular quality of the dyscrasia may be. If I take the syphilitic exostosis as my object for comparison, I should have to imagine some kind of a bony dyscrasia to account for my exostosis. Or, if I take the buboes for an example, the chief mass of which is made up of lymph-cells, I should have to suppose the existence of a lymphatic or cellular dyscrasia.

The lesson, therefore, which syphilis teaches is this, that even where there is a well-marked constitutional cause or specific dyscrasia, the character of the individual products will not be determined simply by the character of the dyscrasia, but to a great extent by the character of the locality in which they originate; and that, moreover, similar products will be produced in different localities only when the specific irritation has reached a certain height (energy). Where the irritation is but slight, bones will produce osseous tissue, fibrous tissue, fibrous tissue, and glands gland-substance; each of these tissues is excited to the production of its own tissue. *The specific substance must possess a certain energy to bring into existence specific products.* Only then will we see gummy tumors—that is to say, specific products—originating in bone, in the skin, and in the glands.

The same is true of the other so-called dyscrasiæ. I need only remind you of tuberculosis. The dyscrasia here, it is true, cannot be proven, but still, by a sort of *consensus omnium*,

it is assumed to exist. Now, in the history of tuberculosis, nothing is more common than to find in the same individual simple inflammatory products by the side of tubercles. In cancer we find exactly the same thing. For instance, in cancer of the serous membranes, it is common to find not only cancerous nodules in different parts of the membrane, but also nodules which under the microscope are found to consist chiefly of fibrous tissue. With great care, however, the cancerous structure—small alveoli filled with cells—can still be detected in these apparently fibrous nodules. By searching still further, we will find nodules which do not even possess a trace of the specific construction, and are therefore to be looked upon as simple indurations. Nevertheless, no one will deny that these simple indurative nodules were produced by the same irritation that called into existence the specific cancerous nodules. It is not easy to explain this difference in any other way than that in the one case the irritation was more energetic than in the other; and that in the last case it was not sufficiently active to impart any of its individuality to the local process.

From such experiences I conclude that even where throughout the body is disseminated a specific material, capable of rendering the blood impure, and of acting as an irritant upon certain parts, thereby exciting them to proliferation, the local conditions, the degree of irritation, the nature of the tissues affected, all have a determining influence upon the subsequent course of the development. I hold, furthermore, that the dyscrasia by itself, without any special local cause, would never manifest any special activity. Finally, if I were asked the question whether, in the present condition of science, the dyscrasia should be looked upon as something lasting and permanent, something that can be transmitted through whole generations, I would, indeed, be at a loss to bring forward a single fact in favor of such an opinion. I believe that the doctrine of permanent dyscrasia should be entirely rejected. The blood, with the constant change of its elements, is entirely unfitted for such a thing: all materials that are foreign to its composition are in one way or another in the course of time eliminated, either outward by way of the organs

of secretion, or by being attracted to some tissue and there becoming deposited.

We will suppose that in one way or another the local irritation[1] has come into play; its effects will naturally be most extensive at that point where the local conditions are at the same time most favorable for its development. Where the irritation is but slight, the results will be such as are usually characterized by the terms *inflammation*, *chronic inflammation*, *hypertrophy*, and *hyperplasia.* It is only with a certain energy of the irritation that specific forms will be brought into existence. Now, experience teaches that the most malignant forms of tumors occur in such organs as are most exposed to external irritation, and that in comparison with these all the other organs are but rarely affected. Tanchou, a French surgeon, has collected together from the civil registers of the department of the Seine the mortality-lists for the years 1830–'40. He found that during this period 9,118 persons died from malignant tumors. In 2,996 cases, or 32.8 per cent., the uterus was the organ affected. The proportion for the other organs was as follows:

Stomach	2,303 or	25.2 per cent.
Mammary gland		12.6 "
Liver		6.9 "
Intestines		4.0 "

Now, if we take into consideration that the liver is almost always secondarily affected, and that consequently a primary gastric or intestinal cancer should be placed on the list wherever hepatic cancer stands, we shall find that the cancers of the alimentary canal represent no less than 36 per cent. of the entire number. Add to this the 32 per cent. for the uterus, and the 12 per cent. for the breast, and we shall have a total of 80 per cent.!

The statistics of Marc d'Espine for the mortality of the Canton of Geneva, between the years 1838 and 1855, give 889 deaths from cancer. It occurred in the—

[1] By this is meant the irritation that is seated within the body, and is at the time exciting certain tissues or organs to proliferation.—EDITOR.

Stomach	399 times	= 45.0	per cent.
Uterus	139 "	= 15.0	"
Liver (and other internal organs)	93 "	= 12.0	"
Mammary gland	76 "	= 8.5	"
Small and large intestines	30 "	= 3.3	"
Rectum	25 "	= 3.0	"

These few organs, it will be seen, represent no less than 87 per cent. of the whole number of cases. I myself have examined the mortality-lists of the city of Würzburg for the years 1852 to 1855. During this time the mortality from malignant tumors was 5.3 per cent. of the entire mortality, and the scale of frequency in the different organs was as follows :

Stomach	34.9 per cent.
Uterus, vagina, etc	18.5 "
Large intestine and rectum	8.1 "
Liver (and other internal organs)	7.5 "
Face and lips	4.9 "
Mammary gland	4.3 "
Total	78.2 per cent.

In other words, the tumors of the abdominal portion of the digestive canal constitute somewhat more than the half (50.5 per cent.), and the female genitalia, leaving out the ovaries, almost a fourth (22.8 per cent.) of the entire number of cases.

From these statistics we are justified in drawing the conclusion that those organs which possess a soft surface, and are often brought in contact with foreign bodies, are more often the seat of tumors than those which are shut up in cavities, and are rarely brought in contact with outside influences.

In considering the homologous tumors, we shall find it impossible to draw a decided boundary-line between them and the inflammatory swellings. When the walls of the uterus become thickened, we speak of it as a case of chronic metritis or hypertrophy of the womb ; but if a distinct lump or nodule is formed, even though its structure is precisely the same as the thickened wall in the former case, we call it a fibroid. It is evident that in so doing we shut our eyes before the existence of the clearest pathological facts.

As regards the histological development of tumors, we are

able now to follow it accurately through its different stages. The difficulty lies only in the etiological part of the investigation: what pertains to the anatomical is now quite clear. At every point where the irritation exists we see at first the same process taking place as in any ordinary inflammatory irritation. A free exudation, a new formation in a free cytoblastema, as has been heretofore universally taken for granted, does not take place; the basis for the new development is to be found in the cellular elements of the mother-tissue. These first in-

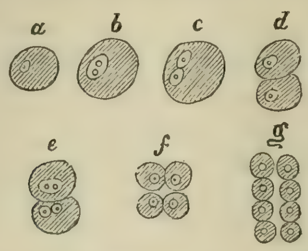

FIG. 1.—Diagram of cell division and granulation: *a*, simple nucleated cell; *b*, division of nucleolus in the enlarged cell; *c*, further enlargement of the cell and division of the nucleus; *d*, division of the cell itself; *e*, further division of the nuclei and nucleoli in the newly-formed cells; *f*, continued division of the newly-formed cells; *g*, still another division, the elements constantly growing smaller, and presenting the character of granulation-cells.

crease in size by taking up more than the usual amount of nutritious material. Soon afterward a subdivision of the nuclei (nucleation) begins, and is followed by an increase in the number of the cells (cellulation). If this progresses rapidly, and if the cells become smaller as they become more numerous, the tissue will then be in a condition to which I have applied the term *granulation*, from its resemblance to what is seen on the surface of granulating wounds. In this condition the tissue may be described as *indifferent;* we may compare it to the condition of things in the egg soon after infructation, where a mass of cells is produced, from whose appearance we are as yet unable to say what will become of them individually. Those cells which are to become brain-matter appear exactly like those which are to become muscle, connective tissue, or epithelium. So it is in the "condition of granulation:" it is an indifferent stage, usually characterized by the existence of small round cells, with slightly-granular contents, a nucleus,

and perhaps a nucleolus. These plastic cells have been known for some time past; Valentin and Müller described them twenty years ago; but they were supposed to originate by a sort of *generatio æquivoca*, in the exuded material or so-called blastema, and to be in no way connected with the original tissues.

It is not every element of the body that can become the starting-point of such a development. So far as our knowledge goes, the red blood-corpuscles do not proliferate, nor do the ganglion-cells of the nervous apparatus, nor gland-cells of decided glandular character, nor fully-developed epidermis-cells. Sometimes, moreover, the new formation will not pass through the intermediate stage of granulation, but the subdivision of the elements will lead at once to the formation of decided typical forms. This is true of the *direct hyperplasiæ*, where the new elements from the very outset present the complete appearance of the old. But, in the formation of tumors, the more rapid and extensive the development, the rarer will be this occurrence; then, even in simple hyperplasiæ, an intermediate indifferent stage will be found. Many tissues which are not suited to the formation of granulations, as, for example, unstriped muscle and glandular epithelium, produce, by the direct subdivision of their elements, tumors of considerable size, and yet no plastic cells will ever be found in them. In the great majority of tumors, nevertheless, this stage of granulation forms an important feature, and we may here mention the fact that *the most indifferent tissues are oftenest the locality from which proceed these new formations.* In the epithelial structures it is always the youngest layers, those that have not yet reached any specific development, as, for instance, the elements of the rete Malpighii, which take on active growth, and by subdivision produce the new elements. Again, among the group of connective substances, the same disposition to granulation is found in those tissues which have reached only the lowest grade of development, as, for instance, in ordinary connective tissue, in mucous tissue, and in the red marrow of bones; while in cartilage and fully-developed bone, both of which are of a higher grade of development, the same disposition is comparatively rare. Even adipose tissue does not as such prolifer-

ate, but first undergoes transformation into a kind of mucous tissue. *The ordinary connective tissue, however, is undoubtedly the most frequent seat of tumor-formations.*

Preceding the stage when the mother-tissue produces the indifferent plastic cells, there is a still earlier stage—that of irritation. To take a simple instance, showing how the process goes on in connective tissue, let us suppose that we have a single spindle-cell before us. At first it will merely increase

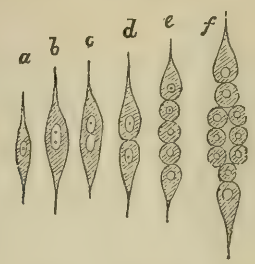

FIG. 2.—Diagram of the growth of connective tissue: *a*, simple connective-tissue spindle-cell; *b*, simple enlargement of the same (hypertrophy); *c*, division of the nucleus; *d*, division of the cell; *e*, continued division and formation of round granulation-cells; *f*, division of the latter.

in size, its nucleus will become larger; then the nucleus subdivides, and is usually followed soon after by the subdivision of the cell itself. This same process is repeated in the newly-formed cells, and so it goes on with considerable rapidity till, instead of a single spindle-cell, will be found a line of small cells, placed side by side like a "row of biscuits." Before the formation of these plastic cells, or, as they are sometimes called, primordial cells, a whole series of changes takes place, and the tumor cannot be said to have begun with the presence of these cells, but with the first change that occurred in the mother-tissue. Now, whether this proceeded from an irritation of a mechanical or chemical nature, or whether there was or not a predisposition, the progress of the development of the tumor is the same up to the stage when granulation-cells (plastic or primordial cells) can be found. It will be readily seen that at this stage no real boundary-line exists between the tumor and the mother-tissue. At first, the union between the two is intimate and complete; but, as the new cells continue to accumu-

late, a difference will manifest itself in the consistency of the two parts, in the condition of the vessels, and in the chemical composition of the tissues; we shall then be able to find a point of which we can say, "This is evidently tumor." But, if we extend our examination beyond this point to what seems to be healthy tissue, we shall find a series of the youngest new formations, and it is from overlooking these changes that relapses so often occur *in loco* after extirpation of the original tumor. Up to the time when the indifferent granulation-cells are formed, and even then, it is impossible to foretell from the appearance of the elements what will grow out of them. At this stage a cancer looks exactly like a tubercle, a syphilitic gummy tumor of the periosteum, like what will later be an exostosis. By this I do not mean that the cells *are* really indifferent, but simply that they appear so to us. They possess no distinctive features whereby we can recognize their peculiarities; they are like the embryonic cells, which undoubtedly contain something peculiar that is to determine their subsequent development. After this period, however, the character of the new growth begins to show itself, and from this time on we can separate the tumors into two large groups. One of these includes chiefly tumors of simple tissues, which present a uniform appearance throughout all their parts. Thus, there are tumors which produce nothing but epithelial elements; in such a case, from a simple spherical plastic cell is gradually developed a distinct cylindrical or pavement epithelium-cell. If such a development takes place in all the plastic cells of the tumor, the entire mass of granulation-tissue will be transformed into an epithelial or epidermoidal formation. Or, if each plastic cell develops in different directions, secreting at the same time a certain quantity of intercellular substance, connective tissue will afterward be found where before was granulation-tissue. To these I give the name of *histioid* tumors.

In the second group, however, the plastic cells undergo a different development in different parts of the growth; for example, in one portion connective tissue will be formed, in another epithelium. In this way the tumor will be found later to consist of bands of connective tissue, in whose meshes are numerous alveoli filled with epithelium-cells. Vessels will

push their way into the connective tissue, and so, little by little, the whole tumor may assume a complex character, which no longer answers to the structure of a tissue, but rather to that of an organ. These *pathological organs* or "organoid tumors" often present the strongest resemblance to certain physiological organs, as, for instance, to glands.

FIG. 3.—Diagram of organoid development. A net-work of connective tissue containing at *v* a vessel, and surrounding a space filled with epithelial cells.

Again, tumors may occasionally be found that are so varied in their composition as to present a strong resemblance to some system of the body, as for instance the skin. Not only the connective tissue and epidermis will be found in such a tumor, but also the sweat-glands and sebaceous follicles, even hairs, and whatever else pertains to the skin. Such a tumor is no longer a simple organ, for the sweat-glands and sebaceous follicles are each distinct organs; it is a fully-developed system. To this variety I shall give the name of "teratoid tumors."

In deciding upon a tumor we have always first to ascertain how it appears—how it is constructed in its totality. In the next place we must ask the question: What relation does it bear to the mother-tissue from which it originates; to what extent does it agree in its later development with the type prevailing in the spot from which it is developed?

When a tumor has reached the stage in which well-characterized tissues are produced, then it may be compared to a plant at the blossoming-time. It is the *stadium florescentiæ*, when the individual elements have everywhere reached a certain typical height, the acme of their growth. In every tumor,

therefore, we must ascertain not only what degree of development may have been attained by the individual elements, but also the average degree of development throughout the growth. This often decides our opinion of the nature of a tumor; for if we find that in its development it has gone but little beyond the stage of granulation, we are at once able to exclude those varieties of tumors which reach a higher stage in their development. Now the question will be asked: How are we to determine this typical height of development? There are two ways of doing it: First, by showing the similarity of the tumor-elements with well-known typical elements of the body; and, second, by proving, if we have the opportunity, that the elements of the tumor, after reaching a certain height of development, do not proceed beyond it. The latter is the more reliable of the two. The more a tumor is composed of lasting elements, the easier it may become a permanent part of the body; even one can carry such a tumor all one's lifetime. But the richer a tumor is in transitory elements, that possess only a limited existence, the more likely it is that the tumor will not remain a permanent part of the body. A cancer, for instance, invariably contains a large proportion of such transitory elements; no one, therefore, can carry a cancer of a certain size through an entire lifetime, or even for ten years. If, indeed, a cancer is carried during a period of ten years, we may be quite sure that the disease is progressing steadily throughout this entire period; that new nodules are forming by the side of the old one. The tumor appears to be the same, but it is constantly growing by additions—by new generations, as in the case of a nation. A nation remains apparently one and the same, yet whole generations are constantly passing away, to be replaced by new ones, so that in reality its character of permanency is only maintained by additions.

Again, the transientness of the elements varies in different forms of tumors. The elements of a tubercle die very early; a cancer lives longer, and a cancroid has an existence still longer. In all three, however, the elements show a tendency to decay. All tumors that consist largely of transitory elements pass through a series of retrograde metamorphoses after

reaching their period of florescence. Here we may mention fatty degeneration, softening, inspissation, and calcification.

In the examination of a tumor we must select for the purposes of study such parts as will still exhibit its typical character, where no signs of decay have yet appeared.

LECTURE VI.

THE BASIS FOR A SYSTEMATIC ARRANGEMENT OF TUMORS.

Before considering how the entire field of tumors is to be classified, I will state that the modern idea of a tumor differs somewhat from that of former times. A number of inflammatory or hyperplastic swellings were then included in the list of tumors which now are excluded from it. To be entitled to the name of tumor the swelling should be, to a certain extent, separated from the other tissues of the body; it should have more or less the character of independence, of *individuality.* Sometimes a cyst is found in the brain with fluid contents and surrounded by a membrane-like layer of connective tissue, which is rightly called an apoplectic cyst. It represents the product of what was once a large extravasation of blood. No one, however, would presume to call such a cyst a tumor. Just so much brain-substance has been destroyed as there is space now occupied by the cyst. The latter, therefore, is not any thing positive, which has developed itself by the side of brain-substance, but simply a defect, occupying the place of brain-substance. Only those cysts are reckoned among tumors, which seem to exist as something relatively independent of the tissues; they must possess something productive in their character.

In reference to the entozoic cysts I shall say but a few words, as they belong more properly to the province of general pathology. They are caused either by the *cysticercus* (*telæ*) *cellulosæ* or by the *echinococcus hominis.* If the sac grows to a large size, we may be sure that it is due to the echinococcus; but if it is small, we can say that *probably* it belongs to the cysticercus. The cyst of the latter is at best no larger than a cherry; commonly it is about the size of a cherry-pit. The

shape is spherical, but is often modified by the resistance of the tissues. In the pia mater cerebralis the shape of the cyst is often rendered mulberry-like by bands of connective tissue, which bind it down at different points. The cysts of the echinococci grow much larger. When first noticed, they are usually about the size of a walnut; with time they may grow to the size of a man's fist or even larger. The parasitic encystic tumors have this characteristic feature, that, when they are cut open, they will be found to possess a double membrane: the outer, consisting of a more or less vascular connective tissue; and the inner, which is the cyst proper of the animal. These two are in close contact, and are easily distinguished one from the other. The outer sac consists of ordinary connective tissue, and is the result of the irritative activity of the organ; while the inner consists of the specific substance of the animal. In the cysticercus it is delicate and almost jelly-like, but in the echinococcus it is peculiarly tough and elastic.

These two varieties of hydatids are the only ones positively known to occur in man. Once or twice I have found quite large cysts in the coverings of the brain. They had sent prolongations into the sulci occupied by the pia mater, and resembled closely the *cœnurus cerebralis.* This parasite is found quite frequently in sheep and cattle, where it gives rise to the "staggers," but its presence in man is not yet satisfactorily established.

Upon an anatomical basis we must separate those tumors which are the result of an actual formative process (pseudoplasms) from those which have a different origin. The latter correspond to the majority of what were formerly called *tumores cystici.* Those tumors which are not the product of a real growth owe their existence either to material that comes direct from the blood, or to the accumulation of certain secretions. If the material comes from the blood, it may be deposited in three forms: 1. Blood in substance—extravasation; 2. Serum, containing water, salts, and albumen—transudation; or, finally, 3. A certain amount of fibrine with the serum—exudation. In some instances there will be found an exudation and an extravasation together in the form of a hæm-

orrhagic exudation; or, with a large amount of serum there will be found a small quantity of fibrine—a serous exudation.

Those tumors which represent the accumulation of certain secretions differ in the following respects: the contents may be chiefly fluid, or chiefly organized elements, or may consist of both. These cystic tumors form a class by themselves. The accumulation takes place in a preëxisting space, which becomes dilated or ecstatic in proportion to the accumulation of the secretion. These tumors could be called ectases, but there is something besides ectasis, namely, the retained secretion. We shall, therefore, call them dilatation or retention tumors.

The tumors of the first class, which consist chiefly of the elements of the blood (extravasations, transudations, or exudations), may either originate in a preëxisting space, or form for themselves a new space. These we shall call extravasation or exudation tumors.

In this way, leaving out the entozoa and simple swellings, we obtain three large groups or classes: first, the exudation and extravasation-tumors; second, the dilatation- and retention-tumors; and last, the true pseudoplasms or neoplasms—the *growths* in the strict sense of the word. The last class, as we have already seen, may be again divided into three smaller classes: the simple histioid, the organoid, and the teratoid tumors. Unfortunately, the classification cannot stop here, for there are many tumors in which different varieties are combined together. These are called Combination-tumors. In some cases these combination-tumors are exceedingly difficult to comprehend.

All heterologous tumors are not malignant. Quite a number of them are practically benign, and may be carried without ever causing any special trouble. In the first place, there are degrees of heterology. The tissues belonging to the group of connective substances are more nearly related to each other than to the epithelial tissues. If, therefore, a cartilaginous or bony tumor originates in the midst of connective tissue, or a myxoma (mucous tissue) in adipose tissue, the heterology in these cases will be far less than if an epidermoidal tumor were to originate in the midst of a lymphatic gland. A matter of still greater importance is the extent to which a

tumor can produce fluid material, that may be pressed out like a juice. This parenchymatous juice is at one time deposited within the cells (intracellular), at another between them (intercellular). A tumor containing much juice possesses to a high degree the power of infection. A dry epidermoidal tumor is much less dangerous than a moist one; a soft cancer is much more suspicious than a hard one. *The fewer vessels a tumor possesses, the more will its infecting power be restricted to the immediate neighborhood; but the richer it is in blood and lymph vessels, the closer the contact of these two fluids with the parenchymatous juices, and the easier will the infection become general.*

I should, perhaps, say something of the nature of these juices, but unfortunately I am not able to do so. What the chemists have accomplished in this department is utterly worthless. I hope that future investigators will accomplish something in this field. There are also many questions concerning the history of tumors and the measures that may be taken for their prevention, which a more accurate clinical study has yet to solve.

ART. III.—*A Sexless Child.* Reported by J. H. HOBART BURGE, M. D., Surgeon to the Long Island College Hospital, etc.

BEING called to see Mrs. W., August 1, 1870, I found that an accidental rupture of membranes and escape of liquor amnii had determined labor at the end of the seventh month. This was her second confinement—the result of the first being a boy, now ten years of age, who has a congenital inguinal hernia. Upon examination, I diagnosticated a breech-presentation, and announced to the friends that we had a boy in prospect. They called him *William*, and are still in blissful ignorance of any doubt as to the sex. From the umbilicus to the pubes there was a tumor of the size of a teacup, quite red, and covered with mucous membrane. This surface was constantly moist, and inclined to bleed a little. From the lower margin of this mass there was a projection resembling the penis of an infant—swollen, of course, and lacking, upon tactile examination, the proper characteristics of such an organ—yet

it occupied the most natural position possible; and, as if to make the illusion more perfect, the gradually widening base of this process presented a corrugated appearance which might easily be mistaken for a scrotum, while at its free extremity it was so folded upon itself as to seem like a preputial meatus. An intelligent and rather youthful nurse declared that she had no doubt it was a "pena." There was no escape of urine at this, nor indeed at any other one point, and the impression of several physicians was that the water escaped by exosmose. The anus was imperforate, and no impulse was communicated to its proper site by the constantly-recurring tenesmus which was observable in the bowels as they distended and threatened to burst the tumor already described. It was assumed that this impulse in the direction of the hernia would render an operation for imperforate anus futile.

A very small quantity of meconium made its exit from the front of the tumor, and, with a view of lessening the child's distress, I enlarged this opening somewhat with a tenotomy-knife, but no relief was experienced—probably because of a constriction at some higher point. At a moment of comparative fre edomfrom tenesmus I passed my fingers into the pelvis, carrying the anterior wall of the tumor backward, and thus discovered that no pubic arch existed, and that there was no distended urinary bladder, and that the ureters were constantly relieving themselves upon this surface, though their point of emergence was not visible to better eyes than mine. The child was small and feeble, but breathed well and took nourishment, at first naturally. It suffered much, and cried almost constantly when not relieved by paregoric, of which ten-drop doses were given two or three times a day. It became very much jaundiced, and died on the fifth day, after several hours of what the people call "inward convulsions." There was at no time any vomiting. The *post-mortem* examination was made after the body was prepared for interment, and was not, therefore, as thorough as I desired. Upon slitting up the process which so much resembled a distended prepuce, it was found to be one membrane continuous with that which formed the entire wall of the tumor. Behind this membrane were intestines only, and, as they escaped, the stomach and liver immediately presented

themselves at the opening. I felt the kidneys *in situ*, but could not trace the ureters. No vestige or rudiment of male or female genitalia could be found. As there was no scrotum and of course no infundibulum testis, and as the child was born at the seventh month, it is possible that, by careful search in front of and near the kidney, a testicle might have been discovered, but this thought came too late to be of any practical value.

Art. IV.—*Notes on Hæmorrhoids.* By John H. Packard, M. D., one of the Surgeons of the Episcopal Hospital, Philadelphia.

I. **Examination of the Parts.**—One of the greatest conveniences in the examination of the rectum, and in fact of the vagina, or any of the orifices of the body, is the forehead mirror used so constantly by the laryngoscopist. 1. It obviates wholly the annoyance of the surgeon having to dodge the shadow of his own head. 2. While his hands are left free, he can, by very slight changes of position of his head, which changes soon become automatic, throw the light just where he wants it, notwithstanding movements on the part of the patient. 3. The examination may be made with the patient in bed, no matter how this stands in relation to the direction in which the light enters the room. 4. By this means, even if the room is overlooked, the patient may be so placed that nothing of what transpires can be seen; or the window may be darkened, and the gas-light, or that of a candle or lamp, may be readily made available.

Especially in office practice, the best position for a male subject, whose rectum is to be examined, is that of bending down forward over the back of a chair, or the edge of a high bed. If the knees are kept straight, this brings the seat into full view, and the surgeon can separate the nates with the fore and middle fingers of his left hand, while with his right he introduces the speculum, probe, or other instrument. Or, an assistant may draw the nates aside with both hands; some patients can themselves do this, lying on the edge of a bed. (The patient, if leaning over the back of a chair, cannot well

put his hands up for the purpose without some risk of losing his balance.)

In examining the anus in the female, the most satisfactory position she can be placed in is on the knees and elbows, on a firm bed or table. Next to this is the almost prone posture, with two or three pillows under the pelvis. Either of these positions may be adopted to advantage in the case also of old, or feeble, or very timid men.

A thorough exploration of the parts is always highly desirable. Otherwise, we may deal with a fistula or a fissure, and then find that there is a pile, or a polypus, or possibly an ulcer, within the sphincter, which must be the object of a second course of treatment; a circumstance vexatious to the patient, and not creditable to the surgeon.

Hence, I hold it to be always advisable to introduce a speculum, and to get a full view of the whole surface of the gut as far up as we can. Generally it involves less pain to take one-fourth of the circumference at a time, removing and reintroducing the instrument, than to try, by rotating the latter in the grasp of the sphincter, to manage with but one introduction of it.

As to the form of speculum to be used, the best view is certainly attained by means of the bivalve metallic one; but, while its introduction is very easy, its expansion is always complained of, and its closure for the purpose of removal is very apt to hurt and pinch the mucous membrane. What is known as the dome-headed speculum, rounded at the end, with a large fenestra at the side, and a wooden plug to fill it out and prevent scraping, answers very well, but gives a more limited view; and the bulging of the mucous membrane into the fenestra is sometimes deceptive. This instrument may be either of metal or of glass silvered within. Still another form, less useful, except in a few cases when the lesion is high up, resembles the Recamier uterine speculum, but is much smaller. It is made of glass, silvered within, and with an oblique fenestra close to its rounded end. Sims's uterine speculum (the smaller end) may be used with great advantage in exploring the rectum (see Dr. Nott's case of recto-vesical fistula in a male, in the number of this JOURNAL for September, 1870).

For operations, this is very convenient, additional room being gained, if needful, by dividing the sphincter on one or both sides. The utmost gentleness should be observed in passing either of these instruments, even if the patient is in a state of anæsthesia; a very painful and unpleasant sense of soreness is felt for days after a roughly-made examination, and the mechanical injury done may affect the success of the treatment.

When the surgeon has once satisfied himself, in any case, that the trouble is limited to the portion of mucous membrane embraced within the sphincter ani, he may generally dispense with the speculum in his after-examinations. In the male subject, the disease may be brought completely into view by straining over warm water so as to protrude it; in the female, by the simple plan now to be mentioned:

By passing the finger into the vagina, and then turning it backward so as to hook it over the upper edge of the sphincter ani, the rectal mucous membrane may be pushed down, and everted so as expose it for one or two inches. Thus many fistulæ, fissures, ulcers, or hæmorrhoids, may be brought into view in their whole extent. This idea is not my own, but I believe it was suggested by Dr. Storer, of Boston; I have found it of the utmost use in a number of instances. It is most available when, as in multiparæ or women of lax fibre, the fourchette and perinæum generally are loose and yielding; in many virgins it would perhaps be impracticable, on account of the well-developed hymen.

Advantage may sometimes be gained by the use of both fore-fingers, the left in the anus, and the right in the vagina, in estimating the actual bulk and extent of hæmorrhoidal tumors, etc. There is so much swelling and congestion produced by the patient straining to protrude these, that it is difficult to judge of their exact size without thus examining them *in situ*. In the male, we must of course be satisfied with the introduction of the finger into the rectum; which ought in my opinion always to be done, in addition to the other investigations before spoken of.

II. **Causes.**—Among the causes of this very troublesome affection, it seems to me that authors have laid too little stress upon hereditation. It has happened to me to attend several

families in which, the fathers being the subjects of piles, the sons have all showed very early a strong tendency to the development of similar disease; and this, notwithstanding a very marked difference between the circumstances and manner of life of the two generations. And if we put the question to patients, "Did your father suffer from piles also?" they will generally answer more or less positively in the affirmative. I speak of the male sex, because hæmorrhoidal troubles are so common in pregnant women, that the fact, if elicited in the case of a female, would have very little significance.

III. **Symptoms.**—Another point, which ought to have attracted more attention, is the amount of sympathetic uterine symptoms which may be developed by hæmorrhoids. I have lately had to operate on a lady, aged about thirty, a multipara, who suffered for four or five years with severe piles, bleeding copiously, and reducing her very much. She had such marked engorgement of the womb, with leucorrhœa, and difficulty of micturition, that the rectal difficulty had been wholly overlooked. Upon the removal of the tumors by means of the écraseur, the uterine troubles yielded very readily to simple treatment.

Great distress may be induced by the grasping of piles by the sphincter, although there is no protrusion whatever. A day or two ago, I was called to see a physician, about forty-two years of age, who has been suffering for about a month with quite a severe attack of hæmorrhoids. He has a fringe of external tumors about the anus, and at every stool a protrusion of a mass from within. But in the intervals he has most violent paroxysms of weight, tension, and bearing down, urgently painful, and dependent on the engorgement, within the sphincter, of a portion of the internal piles. Sitting over hot water relieves this, by relaxing the muscle. This symptom is much less troublesome in cases where the sphincter has become lax, and prolapsus ani is of constant occurrence; hence, it is a feature rather of the earlier and more manageable stage of the complaint than of old and confirmed cases; but it is very seldom alogether absent.

IV. **Treatment.**—In reference to the treatment of hæmorrhoids, I think the cases may be divided more or less accurately

into three classes. Sometimes, as for example in pregnant women, the trouble is due to a temporary cause, and will be relieved by its cessation. Sometimes the rectal lesion has lasted so long, and has become so aggravated, with great relaxation of the parts, that, especially in persons past middle age, it is better to resort to palliative measures only. In other cases, again, and above all where a strong hereditary tendency exists, a radical and most palpable cure can be effected by judicious surgery.

One principle should govern us in all the palliative measures adopted in any case of piles: namely, to prevent straining. And this may be carried out in various ways. Besides the adoption of a proper diet-table, embracing simple but nutritious food, well cooked, and not highly seasoned, there are four points to be attended to. By means of medicine we keep the bowels easily moved; ℥ss or so of sulphur, mixed with cream or molasses, every morning before breakfast, will do this. Or, by very small doses of Epsom-salts, by Vichy, Congress, or Bedford water, we may accomplish the same end. The second measure is mechanical: the patient is instructed to have made a board, with an opening about five inches wide by fourteen long, to place over the ordinary privy-seat, which allows the nates to bulge down too much; this will in a great degree prevent the protrusion of the relaxed rectum. The third is the use of astringent suppositories, to be used after each stool. I have found the perchloride of iron, grs. j, ij, or iij, made up with cacao-butter, to answer best, unless the piles are inflamed, when the acetate of lead is more soothing. The fourth element of the treatment is the employment of a hemispherical block of ivory or vulcanized rubber, about as large as half a billiard-ball, attached to a spring of properly-adjusted strength, and this again fastened to a belt. When in place, this supports the parts, and in cases of great relaxation prevents their descent in walking; the comfort thus afforded is very great.

Operative Measures.—Internal piles may almost always be safely and effectually removed by ligation, and external by the knife or scissors. The cases which give most trouble are those in which the two forms are combined. For a number

of years I was in the habit of dividing the skin, and then ligating the whole mass, internal as well as external.

But, although this plan sometimes gives excellent results, it is open to certain objections. In 1862 I employed it in the case of a gentleman, aged twenty-two, and for nearly a week afterward his sufferings were extreme. The same thing happened in another case under my care at about the same time; although in both operations I thought I had completely severed the cutaneous nerves.

In the two following cases, which occurred to me in 1868, this mode of operation, by reason of the large surface left to be healed, seemed to me to have been in some degree the cause of the untoward results:

March 14, 1868.—I operated, with Dr. T. H. Sherwood, on Mr. C., of Nicetown, aged fifty-two, who had suffered from piles for twenty-four years; he had had in boyhood a fall from a tree, and this had left him irritable and obstinate in temper. The piles were very large; the skin over the external mass on either side of the anus was divided, and a ligature applied with transfixion. On the ninth day both portions came away. On the 28th of March, the healing was going on very favorably, when he sat for some time at an open window, and got completely chilled. Tetanus declared itself that night, and he died on the 1st day of April.

October 22, 1868.—I operated in the same way on a very similar case, in a man aged forty-five, at the Episcopal Hospital. He did very well, the piles sloughing off at the sixth day; but, on October 29th, he was chilled by a draught of air from a window near his bed, was attacked with tetanus, and died two days afterward.

In another case, in private practice, operated on in 1868, I had transfixed a pile, with a very broad base, and proposed to have it drawn down, in order to cast a ligature around it. The gentleman who was assisting me failed in some way to make sufficient traction, and, when the mass tied sloughed away, I found a portion of the transfixing ligature still in place, making of course a fistula. My patient having a dread of any further operation, I used the thread already engaged to draw in another longer one, by tying which and twisting it

daily, I cut through the tissues, and the ultimate result was altogether favorable.

Subsequent experience has satisfied me that the écraseur affords the easiest and best means of dealing with these cases. I pass two needles (the curved are the most convenient), at right angles to one another, through the base of the hæmorrhoidal mass, and separate it at once. By keeping the bowels confined with opium until the healing is accomplished, the patient suffers no pain, and above all is relieved by one single procedure; there is nothing left to come away.

Art. V.—*Carbolic Acid as a Remedy for Carbuncle.* By J. C. Nott, M. D., New York.

My attention having been attracted recently by several articles in the medical journals on the anæsthetic effects of carbolic acid, when locally applied, I determined to test the remedy in a case of carbuncle which came under my care a few weeks ago. All the methods of treatment usually recommended had proved unsatisfactory in my hands, I never having seen carbolic acid recommended for this malady; and, seeing no good reason why it should promise better results, I used it without faith, and more with the idea of doing something to amuse the patient while Nature worked the cure, than with any expectation of doing good.

A gentleman of respectability and good habits, about fifty years of age, had suffered severely, within the last twelve months, with carbuncles on his back, which had been prescribed for by another surgeon. When sent for I found a carbuncle, with several small honey-comb openings in the centre, and surrounded by the usual inflammation and hardness, covering a space about the size of the palm of my hand. It was very painful, presented all the characteristics of a severe carbuncle, and I thought the patient would make a good escape if he got off with a slough as large as a silver dollar. The tissues seemed to be so deeply involved that I could not conceive that the result would be otherwise. I made a deep incision into it about an inch and a quarter, and stuffed it with

cotton saturated with the pure carbolic acid. I also painted over the whole surface of the hardened mass with the acid. The patient complained of a sharp burning sensation for a few minutes, when the pain subsided completely. The cuticle, by the next day, came off, and the surface looked like a burn.

After the first few minutes he was free from pain, and never complained of any afterward. I continued every day for a week to insert the acid, in the same way, into the cut, which sloughed all around to the depth of one-eighth of an inch; the surrounding inflammation and induration subsided rapidly, and in a week there was nothing left to treat, but the small open wound made by the knife and acid. Three other small carbuncles commenced, an inch or two from the large one; they were all treated by incision and the acid, and they all aborted.

One fact of this kind does not establish a principle, but I certainly have never witnessed a more prompt and decided effect from a remedy.

There was, I think, something more than a mere *caustic* effect from the acid in this case. I have used incisions and caustics very often before, but this was the only real abortion of a carbuncle I ever saw. There was, I think, clearly some specific action. We know that a process of embalming has been recently introduced into this city, by which bodies are preserved by *simply sponging* them over freely with carbolic acid. It permeates the tissues in some way, so as to preserve the deep-seated as well as the superficial tissues for an indefinite time, and it is only by some process of this kind that I can account for its influence on the surrounding tissues when inserted into the centre of a carbuncle three inches in diameter.

In this connection I will suggest another application of carbolic acid, which I think promises good results, viz.: in the treatment of fibroid and polypoid growths of the uterus, and perhaps adventitious growths of other parts.

I heard last evening a very interesting paper read before the Obstetrical Society of this city, by Dr. Blake, on the treatment of fibroid tumors of the uterus by cutting out a portion of the centre, and then plugging the gap with lint saturated

with subsulphate of iron. He gives three cases, in all of which the vitality of the tumors was so destroyed that in a few days the whole tumor was successfully removed with cutting instruments, without the slightest hæmorrhage.

Now, carbolic acid I take to be more penetrating in its action, more efficient as an antiseptic, and in every point of view preferable to the preparations of iron.

I throw out these hints, which I should be glad to see tested by others. I shall certainly follow up the idea myself as occasion offers.

Proceedings of Societies.

MEDICAL SOCIETY OF THE COUNTY OF NEW YORK.

Stated Meeting, December 5, 1870.

Dr. Abram Jacobi, President, in the chair.

The President announced the admission to membership of Drs. Henry R. Derby, Jesse L. Morrill, J. Fitzgerald O'Connor, Samuel Sexton, and Alfred L. Carroll.

The report of the Committee on Intelligence was read by Dr. Castle, and that of the Committee on Meteorology by Dr. Goodwillie.

BLOODLETTING IN OBSTETRIC PRACTICE.

Dr. Fordyce Barker read a paper upon *Bloodletting as a Therapeutic Resource in Obstetric Medicine,* which we publish in another part of this number.

Dr. Peaslee was called upon by the President, and remarked:

In advance I will say, that I do not agree with Dr. Peaslee, as quoted in the paper, any more than does Dr. Barker. But if the remainder of the paragraph had been quoted, to the effect that he had himself seen patients bled where he thought it had prevented inflammation, or other ill consequences, but that this practice should be confined to plethoric patients, and never resorted to in the anæmic, then I should be ready to endorse it fully. The opinion was expressed seventeen years

ago, and I have seen no occasion to change it since. With regard to that point, I inquire of the patient, if she be evidently pretty full of blood, whether in previous deliveries she has had any great hæmorrhage, or any accident afterward. If she has had little hæmorrhage in delivery, and has suffered from any subsequent inflammation, I allow her to bleed at least a pint—and if a quart, no matter. But, with an anæmic patient, I should endeavor to preserve all the blood she has in the body, uterus and all, if I could; and should give a dose of ergot ten or fifteen minutes before the expected delivery, to act immediately after it, and save all the blood possible. I frequently hear physicians say it is their invariable rule to give ergot in that way; but I should not give it thus invariably—not to a plethoric patient, but should let her bleed as much as necessary, and then, if requisite, stop the bleeding by ergot, the hand in the uterus, etc. The pregnant uterus, weighing from two and a half to four pounds, should contain in its vessels more than a pint of blood. If the woman is plethoric, and has in every part of the body probably more than the normal amount of blood, I can see no reason for retaining this extra quantity. It has been said that the character of a person has sometimes been entirely deranged in consequence of the amputation of an extremity—that a man, before indifferent and sluggish, would afterward become quite energetic; the three-fourths of a man would be more efficient than the whole man had been before. This is doubtless owing to the fact that it has been regarded as a great merit in surgical operations to lose little or no blood. The limb is drained before cutting, and the surgeon prides himself on his dry amputation, in which not a tablespoonful or a teaspoonful of blood has escaped. I consider this the reverse of a merit in the case of a plethoric patient. If such a patient loses an upper extremity, for instance, that is entitled to something more than one pound of blood; and he should lose that amount with the limb, to leave the circulation in its normal condition. I think that the same principle applies in obstetrics, and that it is a matter of judgment in each particular case whether you shall let the woman lose a pint or more of blood, or as little as possible. I had lately occasion to deliver a

woman extremely anæmic, in whose case I feared the loss of even four ounces. She lost no more than that, I think, and to that I attribute the favorable result.

With regard to venesection in eclampsia, I think there should not be a single doubt as to its immense value. I have seen, in the twenty-nine years I have been in practice, all the change of opinion on the subject of bloodletting, have seen the pendulum swing from one extreme to the other. But we are all of us taking blood in our daily practice, and cannot get along without it. If we apply a single leech, we take blood; if a dozen, we take more; in venesection we take it more rapidly, and with more certainty as to its amonnt—there is no other essential difference. Where there are extreme congestion of the vessels of the head and face, lividity of the lips, dyspnœa, sparks before the eyes, noises in the ears—where we find these signs, and the patient is getting worse, and there is nothing to contraindicate bloodletting, I should feel that I could not conscientiously withhold it. I am glad that this subject has been brought up by Dr. Barker, for it is of the greatest importance that we come to sound ideas upon it. It is said a man's opinions on bleeding are apt to be determined by the amount of blood he carries himself—if of full habit, he will use his lancet boldly; if spare and pale, he may never unsheathe it. By this criterion I ought, perhaps, to be totally opposed to bloodletting; but I must stand as the exception to the rule, and advocate its judicious employment.

Dr. Isaac E. Taylor was the more pleased to hear the views expressed in the paper, because he had supposed that Dr. Barker had adopted *in toto* the ideas of Cazeaux, that the condition in pregnancy is one of anæmia. Cazeaux himself had swung completely from one side to the other, telling us that he had at first come to accept the view of the chlorotic, or hydræmic, condition in pregnancy wholly from analyses of the blood, conducted by Messrs. Andral and Gavarret, though later, in practising upon this theory, he had found clinical confirmation of it. The important practical question would seem to be, how to determine, in a case of puerperal convulsions, for example, between the condition of active congestion and that of hydræmia. Are the symptoms of compression of

the brain due to plethora or to serous effusion? It is not always easy to decide; and we hesitate whether to resort to chloroform, tartar emetic, and venesection, or to quite an opposite course. Though by no means an advocate of frequent bleeding, yet the speaker thought that, if these two conditions could only be clearly distinguished, there would be no treatment of greater value in the cases indicating it. He wished that Dr. Barker had given the diagnostic marks more fully.

Dr. Barker, being called upon to reply, said: If I understand the question rightly, it has reference to the methods of diagnosis between active sanguineous plethora and the serous plethora which occurs in anæmia. I agree with Dr. Taylor that this one of the most difficult points in practical medicine, and often can be settled only by the nicest discrimination. Yet, with reference to the practical therapeutic measure of bloodletting, I have considered the decision comparatively easy. The view I have advocated in the paper is, that in a certain class of cases of anæmia, or hydræmia, the deficiency of red corpuscles may be accompanied with excess in the quantity of blood, such as to produce local congestion, whether of the kidneys—most important of all; of the uterus, jeopardizing the continuance of pregnancy, if not the life of the mother; or of the brain, which often occurs as a result of puerperal convulsions. In these exceptional cases of local congestions occurring in the anæmic, bloodletting may be necessary, though during gestation the amount of blood taken must be small, and limited strictly to the relief of the local congestion, the general condition of the patient being met at the same time by the most nutritious meat-diet and by ferruginous tonics. Bleeding in the convulsions of parturition comes under a different category. There we bleed only to prevent lesion of the brain in consequence of the convulsion—to prevent apoplexy. The apoplexy—when it occurs—is not the cause of the convulsion, but its consequence, by a mechanism which a glance at the conditions involved will readily explain. The laryngeal spasm and the tonic contraction of all the muscles of respiration stop the aëration of the blood and interfere with its passage through the lungs, producing a great accumulation in the right cavities of the heart. The contrac-

tion of the abdominal muscles forces the blood out of the great vessels of the abdomen, and aggravates this condition; while the return current from the brain is still further interfered with by the pressure of the sterno-mastoids and the platysma upon the veins of the neck. It is not strange that, under these conditions, either the delicate vessels of the brain should give way, or serous transudation through their walls take place; and to prevent this it may become imperative to diminish the volume of blood, even in an anæmic patient. In convulsions after labor where much blood has been lost—in a case of placenta prævia, for example—no sensible man would think of venesection. Here the convulsion is due to the hæmorrhage, to loss of muscular and nervous power, and our grand effort must be to restore the exhausted nerve-force. Opium is the great remedy here, and even alcoholic stimulants may be required.

Dr. F. D. Lente had been much gratified with Dr. Barker's paper, and thought it time the question of bloodletting should be reopened. It would be strange indeed if the eminent men of the last generation whom Dr. Barker had named, and a host of others almost as eminent, had no ground whatever for their reliance upon a measure which they regarded as their great remedy. These men were, perhaps, even closer observers than are we at this day; for the multiplication of the instruments for physical diagnosis would seem rather to have blunted our observing faculties. In an obstetric practice of twenty years, the speaker had seen many cases benefited by bloodletting. There were some instances where this measure seemed to force itself on the physician, though he might be unable to assign the definite reasons for it. He was speaking especially of cases of threatened uræmic convulsions, which probably constituted nine-tenths of those in which the question arises.

But he had seen many more patients benefited by other remedies than by bleeding; and, to discuss the question properly, we should consider the effect of bloodletting not by itself, but in comparison with that of the other powerful measures now at our command. Doubtless the disuse of venesection could be ascribed in no small degree to the introduction of other means having a similar immediate effect, without the

remote ill consequences of the spoliative treatment. Veratrum viride, though scarcely to be employed in pregnancy, was little inferior to bloodletting in the certainty with which it reduces pulse and temperature. Specially applicable to the pregnant and parturient conditions were the inhalation of chloroform and the hypodermic injection of morphia. The speaker had seen patients saved by these means in cases where in former times bloodletting would have been the only remedy, and the physician would have been accounted a murderer if he had failed to employ it. He had seen cases where convulsions went on for a week, kept in check only by the administration, during the whole period, of morphia hypodermically and of chloroform. He had never regretted the use of these agents in any instance, and, on the whole, he should rely upon them in preference to bloodletting. It was objected that opium was dangerous in uræmia, and, especially in children, where there was inflammation of the brain or its meninges. In cases of infantile convulsions, where every thing else had been tried in vain, he had given it freely, and, he was confident, had saved the lives of the children.

Dr. James L. Brown: I shall venture to speak merely because I think I represent a class of physicians whose experience has fallen within the period of the last fifteen years or so, in which bloodletting has hardly been practised at all. During that time I have never seen venesection done, and I think I am not alone in this experience. Now, it is a very interesting point to me to know whether this change in practice is due merely to the fluctuation in fashion, or is based upon sound reason. The question is asked, "Can it be that all those eminent men who used to bleed so freely were mistaken?" I think Dr. Barker himself has answered this question in giving the long list of ailments in which those old authorities all agreed to bleed—ailments of the most diverse and even opposite character, in many of which we now know beyond a doubt that bleeding is injurious. You could not now find a man to endorse that list.

There were three conditions particularly mentioned by Dr. Barker as furnishing indications for bloodletting—congestion of the uterus, congestion of the kidneys, and congestion of the

brain. I have seen a good many cases of midwifery, but I have never seen one where I could diagnosticate congestion of the uterus during pregnancy. As to congestion of the kidneys, it is so closely allied to cerebral congestion in the production of convulsions that I think the two can hardly be separated. What we young men want is, to know precisely the indications which call for venesection. It has been said that they are very difficult to define. I think they must be. There is want of precision in the very terms used to express those indications. Puerperal convulsions, for example, constitute no definite index of the patient's condition. In one woman they may be due to chronic Bright's disease, which has been simply aggravated by pregnancy. In such a case no man would think of bloodletting, for no amount of it could relieve the uræmia, as it could not remove the renal lesion. It is a question whether or not venesection is of service in the capillary congestion of the kidneys, to which it is generally believed that convulsions may often be attributed; and as to cerebral congestion, it is well known that there are those who deny that bleeding can affect it. "No amount of bloodletting," says Bennett, "can diminish the amount of fluids in the cranium," which practically amounts to the same thing.

If we leave the older men, and try to settle this question by the clinical practice of the writers of our own day, we find little in the way of definite directions for the employment of venesection. Trousseau very positively forbids it in all such cases as have been referred to here; he thinks it can only hasten the patient's demise. So, too, with many other writers. It becomes pretty difficult, therefore, for us who are not familiar with this treatment, to find any clear rules for its application. We certainly cannot be expected to employ it, in the absence of such definite indications, for the removal of blood must always be regarded, I think, as a serious evil, only to be tolerated when necessary for the removal of a still greater one. As to the so-called condition of plethora, I doubt if there is such a thing. I have never yet seen a man whom I thought to have too much blood in his veins. Dr. Chambers, in his "Renewal of Life," says that he not only does not himself believe in the existence of the plethoric condition, but he

does not know any intelligent physician who does believe in it. If it be true that Nature sometimes makes more blood than is good for a person, I should like to know how to recognize the fact.

I have not assumed that I could throw any light on this subject, but I have ventured to ask these questions, because I think there are many who, like myself, prefer specific details to generalizations. I do not think that the profession has dropped bloodletting without good reason. It is noteworthy that it has not simply modified its practice in this respect, as it has modified its heroic dosing since homœopathy taught it that many diseases would get well without medicine, but it has abandoned bloodletting almost entirely. It appears to be a simple assumption, unsupported by sufficient reasons, to say that in this abandonment the pendulum has swung too far to one side.

Dr. Hubbard had bled in every case of puerperal convulsions that had come under his hands. He had seen its good effects in convulsions both *ante* and *post partum*, and he should use it in both. He related the case of a stout primipara whom he saw for the first time when called to deliver her. He found her sitting up, with face flushed, and pulse full and bounding. These symptoms showed plethora, and he at once proposed to bleed her; but the woman stoutly refused. She soon went to bed, and the labor progressed favorably for a time; but his fears were verified when, as the head was pressing on the perinæum, she went into a convulsion. Then he practised free bleeding, followed by a dose of calomel and Dover's powder; delivered with forceps; and she did well. In another case, of a delicate and by no means plethoric primipara, twenty-two or twenty-three years old, the labor had favorably terminated, although the amount of hæmorrhage was pretty large for so delicate a subject. Convulsions came on sixteen hours after delivery. He bled her a pint and put her slightly under chloroform, when the convulsions yielded for a while, but came on again. Then he gave calomel and Dover's powder, with infusion of digitalis (a suggestion of the late Dr. Batchelder); kept up the chloroform; and in the morning, when the calomel had moved the bowels, the trouble was over.

He thought a great deal of moving the bowels. In this case, although the convulsion occurred so long after labor, the patient had no recollection of his having attended her; and this lapse of memory was characteristic of all the cases he had seen. He was not one of those who had ceased to bleed in these cases in obedience to the dictates of homœopathy or any thing else.

Dr. Prince was one of the favored few who had seen both extremes of practice. As hospital-walker he had had to carry his lancet and be ready to use it in the lying-in, as well as in the general, wards. He had certainly seen benefit from it, in many cases, and he was prepared to endorse to the full every thing Dr. Barker had said. In convulsions he had seen morphia fail to produce the slightest relaxation of their violence, and even chloroform, though often giving happy results, could not be depended upon in every case. In his own experience bloodletting had proved more efficacious than any other treatment. It was essential to use great care in the selection of cases for its employment, and closely to watch the effect produced during the flow. If the patient showed returning consciousness and general improvement, that was a sign that your remedy was doing good.

Dr. Austin Flint, Sen.: I came here to-night, thinking that, as the topic related to midwifery, and it was well known that I was not specially devoted to that branch, I might have the privilege of remaining a silent listener; but I have no right to refuse the President's call. The paper of my friend Dr. Barker seems to me significant not only of the change in the views of treatment of diseases connected with pregnancy, of which I, perhaps, cannot well judge, but of the change of view with regard to the treatment of diseases unrelated thereto. I can go back, as other speakers have done, to the time when bloodletting was very freely and very indiscriminately employed; when it would have been considered malpractice to allow any acute inflammation, and many even of the chronic inflammations, to go without more or less abstraction of blood. At that time, to bleed in inflammation was a received maxim. I recollect even hearing it said, "Where you are in doubt whether to bleed or not, use the lancet; give the patient the

benefit of the doubt!" We can now see that this mode of employing bloodletting was frequently injurious, often, indeed, exceedingly so. There comes to my mind, at this moment, a case of puerperal fever, in which, after consultation with two much older men, I practised venesection only a very short time before death. Under the circumstances where it was then employed, this measure would now be considered almost murderous.

The question that has been raised to-night is certainly pertinent, whether the great change that has occurred since that time is merely the oscillation of the pendulum to the other extreme, or is a real advance, not to be followed by reaction. I think it is easy to see the processes by which this change has been wrought. The effect of bloodletting on the circulation and on the constitution of the blood was studied by Gooch, Marshall Hall, and others; and it was proved that the abstraction of blood aggravates some of the very conditions which were regarded as indications for its employment. The more thorough study of the blood in certain morbid conditions gave us the key to their pathology. Before this, anæmia, for instance, was not known to consist in a diminution of the red corpuscles. Above all, the profession came to see more and more the importance of knowing the natural history of diseases —their progress uninfluenced by any active medication; and, as this study was prosecuted, it was found that diseases, which it was supposed would, left untreated, certainly prove fatal, in reality tended intrinsically to a favorable termination. I am not disposed to give the homœopathists the credit of this. We are indebted for it to the conscientious study of the men in our own profession.

I found myself, in the early part of my professional life, an opponent of bloodletting. One of my youthful essays was directed against it. I have found myself, for the last few years, an advocate of bloodletting to a certain extent; and have ventured the prediction that not many years will elapse before we shall again find the profession practising it, though in a very different way from our predecessors. I feel surer of nothing than of this. The lancet is again to find its place in our armamentarium; and it becomes a question of the greatest import,

as we resume its use, What are the indications for it? What its contraindications? This opens up a great subject, to which, of course, I can do no justice to-night. But I think there is a sound principle applicable to this case, as well as to others. The opinions of those who have preceded us, where they have been generally held, and for a long time, we have a right to assume, cannot be altogether without some basis of truth. Therefore, although every one, who has had the opportunity of observing both past and present practice, cannot fail to admit that much harm was done by indiscriminate and excessive bleeding heretofore, still it would be very unphilosophical to put aside all the former experience as worthless. So, too, with regard to other remedies, mercury, for instance; and I venture to predict that before many years we shall find mercury again held more highly in esteem.

The indications and contraindications for bloodletting I cannot attempt to discuss in these desultory remarks. One of the great advantages which it holds over other measures, by which similar or the same effects may be accomplished, is its promptness of action. We can produce certain effects on the pulse, etc., in a few moments, with veratrum viride, and with other remedies—effects very similar to those of venesection, except that some time must elapse before their appearance. But there are cases—cases of uræmic coma, for example—in which moments are very precious; and it is these cases which will lead to venesection again becoming an effective measure in our practice. What will it do? The practitioners of twenty years ago believed, with great confidence, that the abstraction of blood would sometimes arrest inflammation. I believe that it will sometimes arrest it. I believe that in the last two years I have seen two cases of pneumonia arrested by bleeding. They were cases in Bellevue Hospital; and the diagnosis was based upon physical signs, and was not to be questioned. Doubtless the value of this method of antiphlogistic treatment was formerly over-estimated; but I think it has great value, and that we may employ it in acute inflammation, if there are no contraindications. Those practitioners believed that, if it did not arrest inflammation, it would shorten the period of its duration. I believe it will do this; and I think it a matter of

therapeutic importance of which we may avail ourselves except where there are contraindications, where there is a tendency to exhaustion. In my lectures upon pneumonia, last winter, I opened the subject of treatment by reciting a case from my own practice, which I reported thirty years ago. This case was treated by bloodletting, a moderate amount of mercury, and some tartarized antimony. The duration of the disease was eight days, I believe. I cited it as a good example of successful treatment thirty years ago.

I spoke of one contraindication—the tendency of a disease to destroy life by asthenia. Bloodletting could only increase this tendency. But, where a disease is likely to prove fatal by apnœa, the case is very different. I happen to be now lecturing upon acute laryngitis. Here is a disease which is very apt to destroy life, if surgical interference is not resorted to—which may destroy it in a few hours. The danger is not at all from exhaustion; it is from apnœa, and it becomes important to bring to bear every measure which gives any hope of relief. I advocated to my class, as strongly as I could, prompt, energetic bloodletting. So, *mutatis mutandis*, with apoplexy and insolation. There are some chest-diseases where, by diminishing the quantity of blood, we diminish the amount of labor the inflamed parts have to perform. I may mention that twice in my life I have myself experienced the immediate and delightful relief afforded by bloodletting in an inflammatory affection of the smaller bronchial tubes. This relief was so prompt and so marked, after other measures had been tried for a day or so without avail, that I can never forget it.

It was a striking incident that Dr. Barker could not obtain a lancet at the instrument-maker's. Striking, too, was the remark by one of the gentlemen who preceded me, that he had never, in fifteen years' experience, seen a venesection. It is not long ago that there was admitted to my service in Bellevue Hospital a case of insolation, in which it seemed to me that bloodletting was appropriate. The house-physician was asked to bleed the patient, and replied that he would do so with pleasure, but he had never seen the thing done, and did not know exactly how to go to work; and I soon saw that he did not. Those of us who practised in bloodletting times

used to deem it a very essential accomplishment to be able to bleed well; to apply the ligature with just the requisite tightness; to get the stream of the right size, and in the right direction; by no means to allow it to spurt in the physician's face or over the bed. After what we have heard to-night, I am almost tempted, though I fear it might be hardly decorous, to call on those gentlemen who have lancets in their pockets to show them.

The President was requested to give his views, and remarked:

We have learned to our satisfaction that it would be a great mistake to abstain from venesection as an invariable rule, just as it would be a great mistake to resort to it too frequently. I do not know whether it has been the habit of many physicians not to have recourse to it at all; I know that I very seldom perform it, but now and then deem it indispensable—sometimes once in two, three, four years; sometimes twice or three times in half a year. I will briefly state the indications I have followed. Not a single disease has been named here to-night, nor a single class of diseases, in which venesection should be resorted to, with the exception of one class of inflammations mentioned by Dr. Flint. That, by venesection, inflammation can be prevented, or cut short on the first stage, I believe is true; because it acts to remove one of the requisites for inflammation, that is, dilatation of the blood-vessels, local congestion. Inflammation as such, that is, the new formation of cells, and of fibres out of the cells, will not be influenced by venesection; but the local hyperæmia will be so influenced, simply because it relieves the blood-vessel pressure; and so I imagine that local inflammation may be benefited by bloodletting.

This mechanical action in relieving the blood-pressure makes it of inestimable use in meeting another class of symptoms (not diseases). For instance, I am quite positive that many a case of pulmonary œdema will die without prompt venesection. I have seen such cases; and have performed venesection myself where I was certain that the patient would have been dead in fifteen minutes but for that. But pulmonary œdema is not a disease; it is a symptom which may ap-

pear in the course of a number of diseases. We see it after fevers—scarlet fever, and others. We see it in the same degree, and presenting the same danger, in acute pneumonia. There it takes place from the rush of blood to the lungs in overwhelming quantity; its stagnation from the obstacle to its passage through them; and effusion as a consequence. Pulmonary œdema, then, is only a symptom which may be developed in fever, pneumonia, etc. We treat this symptom by venesection, simply to relieve the blood-vessel pressure, prevent further serous effusion, and allow absorption of that which has taken place. We do not treat the disease itself by venesection; indeed, when we find pulmonary œdema coming on, we do not stop to diagnosticate the disease which has caused it; we have no time for that. We only know that the patient is suffocating from the filling up of the air-vesicles and bronchial tubes, and that, if any thing will relieve this, it is venesection; some open a vein at once, and consider the diagnosis afterward.

The same holds true of œdema of the brain. No matter whether this is the result of local disease, as, for example, apoplexy with consecutive inflammation, or of an essential fever, we shall, in all probability, as soon as we are satisfied there is œdema, first draw blood and relieve the patient, then look for the diagnosis.

The indication in all these cases is a vital one. We cannot ask ourselves: What will become of the patient next week? How pale will she look? How long require for convalescence? We can only ask: Will this patient live for half an hour if I do not resort to venesection? The symptomatic indication is thus fulfilled; and in most cases we shall afterward have time to decide what shall be done to relieve not only the previous general anæmia, but also the added trouble brought on by our enforced interference. So in all the cases mentioned by Dr. Barker, I believe we are to resort to venesection simply to save the life of the patient.

I would attempt to answer one question which has been put to-night: What is the difference between that œdema of the brain which we see in cases of fever, pneumonia, etc., and that œdema which we see in the cases that have been called,

by Marshall Hall and others, cases of hydrencephaloid disease? I think the difference a vital one with reference to treatment; therefore, it is important to make the diagnosis. In hydrencephaloid disease we have more or less chronic exhaustion. We seldom see such a case except there has been some exhausting disease at work, for one day, one week, six weeks. Under this the brain gets emaciated, just as do fat and muscle. It is no longer large enough to fill the intercranial space, and effusion must take place. We have effusion into the brain-substance and into the arachnoid sac, so called, or, as I prefer to say, arachnoid tissue. We learn, then, from the history of the case, that there has been chronic pneumonia, intestinal catarrh, or longer-continued chronic diarrhœa, etc., and in such a case we ought not to resort to bloodletting. But, where we have to deal with acute œdema, we have no such history of exhausting disease. We find simply an acute disease, as a fever, which we may perhaps diagnosticate at the moment, or may not. When we see dilated pupils, flushed face, delirium, we are not to consider: Has this poor woman been anæmic before, and are we not in danger of rendering her more so? but, can she live in this way four hours? No matter how she may look in six weeks, we shall be satisfied if we have saved her life.

On motion of Dr. Chadsey, it was voted that, as the first Monday in January, prox., will be the day devoted to New-Year's festivities, the next regular meeting be held on the second Monday in that month.

The President announced that, at the next regular meeting (January 9th), Dr. Knapp would read a paper upon bone-formation in the eye; and that, at the regular meeting following (February 6th), a paper would be read by Dr. Austin Flint, Sen.

The meeting adjourned.

MEDICAL LIBRARY AND JOURNAL ASSOCIATION.

Stated Reunion, October 7, 1870.

We have been unable until now to find room for this important discussion on Dr. Keyes's paper, which appeared in the November number of this Journal.

Dr. F. R. Sturgis, referring to a statement that syphilitic epilepsy had never been observed to occur within less than a year from the time of infection, said that he had seen a case, in the practice of Dr. Bumstead, where a young man, twenty-three years of age, had been attacked with epilepsy within six months after the initial chancre. The history of the patient was gathered from his friends, and, so far as could be learned, he had never before had epileptiform seizures.

Dr. A. C. Post had examined, at his clinic the day before, an infant of twelve months, suffering from chronic hydrocephalus, and bearing undoubted evidence of syphilis. Hydrocephalus had not been mentioned as a result of this infection.

Dr. R. F. Weir had been glad to hear the rule so distinctly stated, to push the iodide of potassium rapidly to the point of toleration. He had been forcibly impressed with its importance by the case of a patient to whom he had, at one time, been giving three hundred and eighty grains a day. A woman of about forty had evanescent hemiplegia following syphilitic primary lesion. As this symptom passed off, in the course of forty-eight hours, there was developed that of a firm band about the waist, and also some trouble with the bladder. Under the use of the iodide she became convalescent, and went into the country. Some two months later she had a second evanescent attack of hemiplegia, upon the opposite side, and again the difficulty with micturition, and the distressing sensation of the girdle around the waist. She had recourse to the iodide, in saturated solution (an ounce of the salt to a fluid-ounce of water), and wrote that when she reached the dose of five hundred and seventy drops in the twenty-four hours the girdle vanished, the functions of the bladder were restored, and she felt herself a well woman. As a drop of the solution contains but about two-thirds of a grain of the salt, she was then taking three hundred and eighty grains a day.

Dr. Bulkley's experience corroborated the statement that syphilitic hemiplegia occurs without loss of consciousness. He had also seen one case of acute syphilitic mania, like those related. In the treatment by mercurials he decidedly preferred the protiodide to the biniodide.

Dr. W. H. Draper would refer to one point in a case, related in the paper, which had come under his own observation. He had frequently examined the patient's urine, finding nothing abnormal except, of course, the constant presence of iodide of potassium. But on one occasion he discovered large numbers of hyaline casts, especially of the smaller tubuli; they were more abundant than he had ever before seen in any case, though the urine was not albuminous. This caused him some anxiety, suggesting the question whether, in giving these large doses of iodide of potassium, we do not run the risk of laying the foundation of chronic Bright's disease. He had since often examined this patient's urine and had not again found casts; and the man was now in the enjoyment of robust health. Dr. Van Buren, to whom he had mentioned the subject, had never seen casts in the urine of patients taking the iodide. The question was an important one, as probably the greater part of the salt finds its exit in the urine, and it would seem hardly possible to keep up so great a degree of diuresis for a long time, without producing so much congestion of the kidney as to give rise to renal lesion. The speaker continued:

Another case came under my observation about six months ago, sent to me by Dr. Tilden Brown, under whose care he had been for the six months previous, having been admitted to the Bloomingdale Asylum for symptoms of dementia. He was sent to me for excessive diuresis. I found him passing nine pints of urine in the twenty-four hours, with an average specific gravity of 1005. He was much emaciated, with dry skin, dry mouth, constipation of the bowels, and marked physical exhaustion, as well as mental prostration, though from the latter he had somewhat recovered. He had hardly entered my office when he was obliged to lie down on the lounge, and it was with great difficulty that he could give me his history. At first I had no suspicion of syphilis, and treated the case

with valerian, according to the suggestion of Trousseau. It produced little effect upon the polyuria. After seeing him two or three times, I inquired if he had ever had any venereal disease. He said that, four years before going to the Bloomingdale Asylum, he had had a sore pronounced by Dr. Sayre to be a chancre. I inferred also, from his statements, that he had been treated with mercury. He had had multiple adenitis; and the sore had healed in five or six weeks under the medicine given him. About six months after the primary sore healed, he had a pustular eruption on the back and in the scalp. He had never had rheumatism. Thinking it possible that the diuresis might depend upon the existence of an intercranial syphilitic lesion, I determined to put the patient upon the use of increasing doses of iodide of potassium. I began with ten-grain doses, and the improvement in the patient's general condition was astonishingly rapid; he gained strength and spirits so fast as to amaze himself as well as his wife, who always accompanied him. The effect upon the urine was not so marked at first, but in the course of two months was quite decided. It had then diminished in quantity from nine pints to five or six, and attained, in one instance, the specific gravity of 1010. The man had meanwhile gained flesh, color, physical strength, and nervous energy. I increased the dose of the iodide to twenty grains, and continued it for three or four months longer. It is now a month since I have seen the patient.

This case interested me greatly, as suggesting the possibility of an intracranial lesion so located as to give rise to that irritation which we know will produce diabetes, either of the sweet or of the insipid form. For, although there is not, so far as I know, any observation of diabetes produced by syphilitic lesion of the brain, yet we know that experiment has demonstrated that irritation of the floor of the fourth ventricle, of the optic thalami, of the crura cerebri, or of certain portions of the spinal cord, will give rise to diabetes, sweet or insipid. We know, too, that tumors located in this region will also give rise to it; and it has been shown that in certain cases of hemiplegia, dependent upon apoplectic clots, diabetes occasionally results. Thus it appears to me not at all improbable that a syphilitic meningitis or gummy tumor may be so situ-

ated as to give origin to this symptom. With regard to this case, I do not know that this conjecture of mine is correct, but it seems quite possible that it may be so. At any rate, taking into consideration the cerebral symptoms for which the patient was under the care of Dr. Brown, and the diabetic symptoms for which he came under my care, and comparing the case with the instances of insanity from syphilis reported by Dr. Keyes, it becomes one of remarkable interest.

Dr. Keyes had found casts in the urine of but one of his patients while taking the iodide of potassium. He was taking the dose of eighty-seven and a half grains three times a day, when he became affected with slight nausea; and the urine exhibited hyaline casts, though very few of them, and traces of albumen; no blood. The doctor had known the patient for a couple of years before, and occasionally examined his urine, finding neither casts nor albumen. There seemed to be no cause for their appearance except the medicine, and the question had arisen whether it was justly chargeable to that. The patient went into the country, dropping one of the three doses a day, and continuing the other two. The albumen and the casts gradually disappeared, and did not return.

The President said that, about twenty years ago, the question of the proper dose of the iodide of potassium was brought prominently before some of the London medical societies, and the conclusion reached that two-grain doses, long continued, were less harmful and more permanently efficacious than the larger ones.

Dr. C. C. Lee had, within two years past, had under his observation, at Charity Hospital, three cases of Bright's disease in syphilitic patients, who were given large doses of the iodide of potassium. In each of these cases, when the iodide had been taken for a week or ten days, the number of casts in the urine was materially increased, as was also the proportion of albumen. In each case he had been led to believe that the increased irritation of the kidneys was caused by the salt; which was, nevertheless, continued as long as the syphilitic symptoms remained prominent. The casts were chiefly hyaline, though in one case there were a few fatty casts, and in another a few granular ones. These last had existed previously

to giving the iodide, and he did not know that they were specially increased by it.

Dr. M. H. Henry spoke of the great difference in the doses of iodide of potassium as given in England and in this country, and was convinced that our experience justified the more heroic treatment. He alluded to a frequent action of the drug in diminishing or completely dispelling the paralysis (mydriasis, ptosis, etc.) attendant on cerebral affections of syphilitic origin, while having, for a long time, no perceptible effect upon the patient's mental condition. In illustration of these points he related a case of extraordinary interest, the report of which we withhold by request, as the patient is still under treatment, and the doctor intends to report the case in full when complete.

Dr. Draper stated, in reply to a question, that in the case of dementia and diabetes which he had detailed there was no paralysis.

The President had, in several cases of syphilitic hemiplegia, given small doses of bromide of potassium in conjunction with mercury, and the results had been favorable. He thought it well to give mercurials in connection with the iodide of potassium, as it had been pretty well established in this city that these, especially the bichloride, tend to prevent the development of Bright's disease.

Dr. F. P. Foster inquired whether any of the gentlemen had seen examples of the syphilitic analgesia lately described by Fournier. He had had one case in dispensary practice. A woman whom he had treated for syphilitic iritis sent for him some months later, and he found her with slight impairment of muscular power in the right lower extremity, and very considerable impairment of sensation in the same limb. He could find nothing pointing to any lesion of the spinal cord.

Dr. R. W. Taylor had, since about the first of January, when his attention was drawn to the subject, carefully sought for this symptom in fully fifty cases of secondary syphilis in women, and had yet to find the first instance.

Dr. Keyes had been on the lookout for it, but without success.

Bibliographical and Literary Notes.

Art. I.—*Lectures upon Diseases of the Rectum, delivered at the Bellevue Hospital Medical College, Session* 1869–'70. By W. H. Van Buren, A. M., M. D., Professor of the Principles of Surgery, with Diseases of the Genito-Urinary Organs, etc., in the Bellevue Hospital Medical College. New York: D. Appleton & Co. 1870. 12mo, pp. 164.

The author informs us that these lectures, the most of which were originally published in the *Medical Gazette*, comprise the results of a good many years of observation, both in hospital and private practice.

We deprecate books, on any subject, of excessive length, but considering the frequency and importance of rectal diseases, and the singularly favorable opportunities which the author has enjoyed, this book is an inconsiderable performance for one occupying so distinguished a position. Bushe in this country, Quain and other transatlantic surgeons, have each, according to their opportunities, handled the subject of rectal diseases in practical and well-considered treatises of fair proportions. However, Dr. Van Buren's book pithily expresses the views of a practical surgeon familiar with these diseases. As if the result of an after-thought, he has, in our opinion, ended his book where he should have commenced it, that is, by remarks on the proper exploration of the rectum. The use of Sims's speculum, with the patient in the "semi-prone" position, widens the field for the study of diseases of the rectum. Dr. Van Buren, it seems, is quite accustomed to this way of examining the rectum.

The first lecture opens with a brief account of pruritus ani, erythema, herpes, chronic eczema, thread-worm, and ends with remarks on external hæmorrhoids. Prepared oakum is recommended as a useful application to the affected parts in chronic eczema of the anus. Allusion is made to the *trichophyton* of eczema marginatum, and to the proper manner of killing this vegetable parasite with sulphurous acid. He tells how to dislodge the oxyuris vermicularis with injections of lime-water and carbolized clysters; he glides smoothly into the

subject of external hæmorrhoids, and repeats, briefly in substance, much that Mr. Quain and others have written on this matter.

The second lecture is devoted to internal hæmorrhoids. The ligature is preferred to all other means of treatment. Dr. Van Buren falls foul of clamps, and disposes of them in two lines. The ligature is a trusty friend; but, to borrow a careful expression of good old Sir Roger de Coverley, we believe that we can properly say that "there is much to be said on both sides."

In the third lecture, polypus, prolapsus ani, and abscess, are incompletely treated, and the subject of fistula in ano is partially considered. It is finished in the fourth lecture, which discovers such an acquaintance with the subject as could be readily gained from most of the text-books on general surgery.

The fifth lecture describes fissure of the anus. In the treatment of this complaint, Dr. Van Buren makes free use of his thumbs, and his remarks on anal fissure are eminently practical. They are quite to the point, and most advantageously contrast with much of the flatulent verbiage which has been written on this subject.

In operating for hæmorrhoids, he first, very properly, we think, forcibly dilates the sphincter ani, so as to paralyze the action of this muscle for a few days.

The sixth lecture is devoted to stricture of the rectum. The statement that, in the majority of cases, this disease is due to cancer, we are somewhat loath to accept. We believe that stricture of the rectum, especially if it occupy the lower third of this gut, is oftenest seen in women, and is, in some way, nearly always associated with antecedents of syphilis. However, let the doctor, who is a syphilographer, explain himself in the following rather infelicitously-expressed sentence: "Since clearer ideas have begun to prevail as to what syphilis really is, the distinction between it and the other contagious sores contracted in promiscuous intercouse, known as simple or soft chancres, is more generally recognized, it has become evident that true syphilis has little or nothing to do with the causes of stricture of the rectum." In a foot-note, he alludes to the interesting paper of Gosselin on stricture of the rectum,

and also to one by Desprès. Both of these papers are published in the *Arch. Gén. de Médecine*, and are well worth a careful perusal.

Dr. Van Buren, very properly, we think, dispenses with the exploring bougies and other contrivances which are designed for detecting a stricture of the rectum not within reach of the finger.

The seventh lecture describes cancer of the rectum; and the eighth and last lecture passes rapidly in review the following subjects: diagnosis, means of exploration, neuralgia, and atony of the rectum. Impacted fæces, together with the hygiene and special therapeutics of the rectum, receive a small share of the lecturer's attention.

We regret to observe in the book quite a number of grammatical errors, which, from the well-known literary acquirements of the author, could only have crept in from carelessness or undue haste in composition. Many of these errors hinge upon the use of the possessive form of the impersonal pronoun "it"—the most abused word, in our estimation, in the English language. However, these faults of composition are minor blemishes, which will not keep the book from being read with much instruction by the many, who do not wish to go too deeply into the study of rectal matters. The general appearance of the book is attractive, and highly creditable to the publishers.

Art. II.—*A Treatise on the Theory and Practice of Obstetrics.* By William H. Byford, A. M., M. D., Professor of Obstetrics and Diseases of Women and Children in the Chicago Medical College, etc. New York: William Wood & Co., 1870. 8vo, pp. 457.

From title-page to colophon we have read every word of Dr. Byford's treatise on obstetrics, and a more disappointing task has rarely, if ever, fallen to our lot. This disappointment grows out of the fact that a book which contains much really good teaching—in advance even of what is to be found in any other book in the language—should, by obscurity and involution in the style of the author, as well as by gross errors, be-

come in a large degree unintelligible, except to one who is already an adept in obstetrics. And yet, this is the sober truth in the case of the book now under notice. In support of this statement, we present at the outset some quotations selected at random, from more than two hundred passages marked in our reading of the book. What kind of an idea will the average medical student of the period gather from these extracts?

"But, as is most frequently the case, the fistula remains open until the breast ceases to secrete all the milk produced by the lobe, whence the reservoir is supplied flowing out at the place" (p. 259).

"We ought also to expect, and be governed in our actions by the suspicion, that after tedious labor, labors in which the liquor amnii has been evacuated early, and, in fact, any of the conditions that usually precede it, the occurrence of atony of the uterus" (p. 420).

"Short funis is mentioned as the cause of difficult labor, but in all authors that I have examined upon the subject—and I have certainly not seen an instance of the kind—I am in doubt whether it is an imaginary or a real one" (p. 302).

"The persul. iron, applied on lint to the os uteri, causes the blood that comes in contact with it to coagulate, and thus acts as a means of retaining the blood itself as a plug in the os uteri, until that is nearer and in the mouths of the vessels to coagulate" (p. 387).

"This" (diagnosis of the fluid contents of a tumor) "may be done by the sense of fluctuation detected in it, and it may be distinguished from distention of the bladder or the rectum by fluid contents, by passing the catheter into the bladder and removing the contents of the rectum" (p. 290).

"Much more effect is exerted on the uterus by moderate griping from aloes—because it is upon the lower bowels, between which and this organ there is strong sympathy—than much greater irritation by jalap, for instance, because the upper part of the intestinal tract is the locality most affected" (p. 132).

Now, these quotations are not exceptional, nor do we introduce them with any unkindness, or in a spirit of ridicule.

They give a fair idea of the style of the author whenever he ventures on any but the most abbreviated sentences, and the duty devolving on us as the reviewer necessitates this unpleasant but impartial criticism. In addition to these faults of style, there are numerous other and less excusable errors, which we may as well dispose of at once, and before considering the subject-matter of the book.

Dr. Byford makes sad work in orthography as well as grammar. Thus, he uses *ovi* for ova, *fimbria* for fimbriæ, *primipara* and *multipara* for primiparæ and multiparæ, *canalicula* for canaliculi; he calls the spermatozoa *animalcula*, and yet says "*they* are are not properly independent beings;" he speaks of the *pubis* when he means pubes, though once (on p. 381) he uses the word correctly; and a second time he came very near doing the same thing, but an atrocious typographical error made the word *tubes;* position and presentation, words which ought never to be used but with the most scrupulous accuracy, are occasionally employed as interchangeable or synonymous terms; *liquor amni* occurs so frequently that we cannot suppose it a mere typographical error; *partially* is made to do duty for locally; *without* repeatedly stands for unless; the distinction between *will* and *shall* is generally overlooked; while in the matter of proper names he evinces an entire, almost wanton disregard for any proprietary rights of the owners thereof, in their proper appellations. At times, too, the odd collocation of words puts a most ludicrous construction upon his sentences, and forces a smile from the reader in spite of himself. Thus, on p. 444, we find: "A case recently occurred in the practice of my colleague, Prof. Roler, in whom œdema and albuminuria persisted for several weeks before confinement;" on p. 234, he mentions "a very large female child, weighing thirteen pounds, with the face to the pubis;" on p. 130, he speaks of using chlorate of potash, "where disease has been protracted a great length of time, with good results, I think, generally mixed with food of an appropriate character;" on p. 124, he refers to "a white boy sixteen years of age, early in the morning," etc.

On p. 4 the author describes the plane of the inferior strait of the pelvis as "a line drawn from the point of the

coccyx to the arch of the symphysis," and, in the figure (No. 3) illustrating this, the line is drawn from the tip of the sacrum, which is correct. In describing the mechanism of breech-presentations (p. 200) the text correctly has it, "the *right* hip distends the perinæum," but the illustrative figure represents the *left* hip in this attitude. On p. 210, it is said that, "in the second position of the vertex, the most dependent part of the presentation is within about an inch of the right sacro-iliac junction," while the accompanying diagram (105) represents it at the right acetabulum. On p. 199 the author says that the movements in the second position of vertex-presentations "are the reverse in direction to those of the first;" while even our average medical student above referred to knows that it is only the movements of rotation which have this reverse direction in the two positions. On p. 436 drawings are introduced to illustrate prolapse of the cord, and the most ingenious anatomist would be puzzled to discover in these drawings the slightest semblance to the "human form divine"—indeed, the figures are worse than caricatures. On p. 104 we find it stated that "the symptoms of pregnancy are not regarded as positive evidence of that condition, and we are not justified in deciding by the symptoms alone in cases where there is much at stake." A little reflection satisfies us that Dr. Byford meant to say the *above-described* symptoms, and we suspect he intended also to contrast the physical signs obtained by auscultation, percussion, palpation, and vision, with the rational or functional symptoms; and yet he includes all under the generic term *symptoms.* To recur again to our average medical student, we ask, would not blank despair seize upon him in the face of so categorical an assertion as that just quoted, and yet so contradictory, even of the author's own teaching?

But we must cease from our fault finding, for a whole number of the JOURNAL would hardly suffice to enumerate all the errors we have noted in reading the book; and we have yet much, very much to say commendatory of Dr. Byford's teachings. We are aware that to make such strictures as those above enumerated does not call for a very high order of intellect, and that possibly with those who affect to despise refinement

and culture, we may lay ourselves open to a charge of hypercriticism; but we cannot concede the right of any one, who sets himself up as a teacher, to place before his pupils such unintelligible and perplexing statements, such positive errors, and such gross carelessness as pervade the book now before us. The standard of medical education among us, lamentably deficient as it is, will not warrant such an absurdity, and it should be every one's effort to raise and not to depress that standard. The American language which our transatlantic brethren profess themselves unable to understand is already a by-word and a reproach; and in medicine at least we would admit nothing which can bring even a suspicion of confirming this evil repute. Dr. Byford's book can, by no possibility, have any other tendency, and viewed in this light the publication is to be regretted. But we turn to pleasanter themes.

Measurements of the pelvis are fully described in connection with the anatomy. The study of pelvimetry is too much neglected in this country, and the twelve pages which Dr. Byford gives to this subject are well applied. Van Hueval's new pelvimeter and its application are described (quoted from Cazeaux) and a drawing of the instrument given; yet, in explaining the application, figures of Van Hueval's *old* instrument, which differs materially from the new one, are copied from Cazeaux. Dr. Byford then describes his own pelvimeter, which is a modification of Baudelocque's callipers—one arm of the instrument being angular instead of curved. This modification is a valuable improvement on the original instrument, rendering it much easier of application for intra-vaginal measurement.

The whole subject of generation, with the development of the ovum, is treated of somewhat hastily, and in a labored manner. The illustrations are full, all of them being borrowed from Joulin's work, so well known to obstetricians. Twenty-two pages are then given up to a discussion of the symptoms of pregnancy, the conclusion of the whole being one that will commend itself to most observers, namely, that "no man is justified in giving a positive decision for or against the existence of pregnancy until he has satisfied himself, beyond a reasonable doubt, that he has heard the pulsations of

the fœtal heart." Next in order, the question of the duration of pregnancy is disposed of within the limits of a single page. No distinction is made between insemination and fecundation, and no explanation is given of many of the supposed cases of protracted gestation, nor is the jurisprudence of the subject even alluded to.

Under the head of "general pathology and therapeutics of pregnancy," Dr. Byford gives much sound advice. He advocates venesection perhaps a little too freely, though we suspect on this point his views will pretty nearly coincide with the practice of ten or fifteen years hence, for there seems now to be a reaction taking place against the exclusive disuse of the lancet which has so characterized the practice of the last ten or fifteen years. Quinine we are glad to see approved of in pregnancy, and the disfavor into which this drug has fallen, through the warnings of certain alarmists, will no doubt be largely dissipated by Dr. Byford's positive assertion of its innocuousness. This opinion is backed up by an extensive experience and practice in a malarious district—the explanation of the frequency of abortions in these regions being that the antiperiodic is given in too small doses to promptly arrest the disease, thus allowing time for the injurious effect of the disease to destroy the fœtus. In the pages set apart for the consideration of labor—for the book is not divided into chapters—Dr. Byford discusses the physiological and mechanical phenomena, without using the divisions or stages generally made by systematic authors, and without so much as an allusion to the accepted nomenclature of this so-called mechanism. There is a decided disadvantage in this teaching—that the student loses the analytical study so essential in inducing accurate observation and discrimination in diagnosis. In the conduct of labor, and the care of the patient after delivery, as well as the management of the new-born child, the directions laid down by Dr. Byford are capital. He is bold enough to face all recorded authority and advise the feeding of the puerperal patient right up to her physiological condition; he doubts whether there is any advantage in support of the perinæum, and we suspect his practice goes even beyond a doubt, and amounts to an earnest protest against a practice that, in our

estimation, is unphysiological and irrational, and calculated to promote the very disaster we wish to avoid; the binder he approves of, but only to give comfort to the patient by the support afforded to the abdominal walls; a compress over the uterus is also "often advisable," he says, but, why this is so, no explanation is given; the practice we believe essentially faulty; in the case of the child, he says, the simpler the first dressing the better, and he then protests against the use of that time-honored absurdity, the belly-band. This is splendid teaching, and every physician in the land should exert himself to secure a more physiological as well as comfortable dress for the new-born than that which is now universally used. But we cannot stop to enumerate further. We may say that in all these practical details of the care of patients, the advice given is sound, and every way worthy of adoption. Indeed, these sections are, by all odds, the most valuable portions of Dr. Byford's book.

The section which treats of the uses and application of the forceps and of operative midwifery is full of substantial and commendable advice. Dr. Byford insists that it is the business of the practitioner to prevent damage by discovering the approach of danger, and applying his remedy in due season, instead of waiting till, perhaps, irreparable injury has been done to mother or child. He lays down clear and explicit indications for interference—indications which, if followed out in practice, would place the forceps where we believe they deserve to be placed, in better repute than they have yet acquired, except among a comparatively small portion of the profession. Dr. Byford gives the preference to Elliot's instrument for extraction from the superior strait, and to Hodge's when compression or powerful traction is necessary. Dr. Evans's extractor—an instrument which we had supposed was consigned to our museums as a curiosity—is figured and strongly recommended, though its advantages over the forceps are not apparent. We suspend judgment, however, for ourselves, inasmuch as we have never used the instrument.

There still remain many subjects to which we might revert with profit, but this notice has already far exceeded the limits we had intended. We are glad to say, however, after finding so much fault, that we can generally approve of Dr. Byford's

practice, and we feel sure that he must be a most excellent practitioner. In this respect, the student may with advantage adopt the teaching of this work, although this teaching is sadly injured if not wholly defeated in usefulness by the faults which we have deemed it necessary to point out.

Art. III.—*The Practice of Medicine.* By Thomas Hawkes Tanner, M. D., F. L. S., etc. Fifth American from the sixth London edition. Enlarged, and thoroughly revised. Philadelphia: Lindsay & Blakiston, 1870, 8vo, pp. 1,200.

The best commendation, we think, that can be made of Dr. Tanner's Practice of Medicine, is a simple statement, that within five years it has passed through six editions in England, and five in the United States. And this especially is a significant indication of the estimate put upon the book, when it is remembered that it is within that time that the works of Aitken (enriched by Clymer's annotations), Flint, Niemeyer, and Reynolds, have been published and largely distributed to the profession, wherever the English language is spoken. It would seem almost as if there were no room for another "Practice," and yet, we doubt not, Tanner in its improved form will not only hold its own in the race with these formidable competitors, but the many and valuable improvements made in this edition will give it, if possible, a still stronger hold upon the profession. All the leisure that could be wrested from the onerous duties of an active practice has been for two years, the author tells us, devoted to the preparation of this edition, thus rendering it more worthy of the great encouragement hitherto bestowed upon it. And right well, too, has he succeeded. The distinguishing features of the work are its terseness and its practical character—for it must be remembered that we have included the subjects of venereal, skin, and uterine diseases, so frequently treated of in separate works. The consideration of these three important classes of disease was essential to the unity of Dr. Tanner's plan, and in view of the completeness of the book it was wise to include them.

We purpose no review of the book, for it is not needed at

this late day. There is one plan pursued in Dr. Tanner's book, however, which we desire particularly to commend, and that is the giving the etymology of the various technical names used in the volume. This is of special importance, we think, in this country, where the educational requirements for entry into the profession are so small, and where such loose and disjointed opinions prevail regarding these requirements. Any thing that will help us in this matter we will gladly approve, and certainly one step in advance is a clear understanding of the meaning and origin of technical terms. The appendix of this book will be esteemed as another most valuable feature. It contains numerous formulæ for the administration and composition of remedial agents, and includes the consideration of aliments, baths, climates for invalids, and mineral waters. The importance of the last two topics is yearly more and more acknowledged, and is evidenced by the increased attention given to these subjects in our periodical literature, and by the many special treatises appearing from time to time. Hydrology, in its relations to the cure of disease, in this country at least, is too little understood, and too little relied upon, while in Europe one may observe, by consulting the recent Continental works, that there is a steady increase in the therapeutic use of mineral waters. All the necessary information regarding the principal springs of Europe will be found in this appendix, and we can only regret that this information does not extend to the springs of the United States.

Dr. Basham, in his little book on Renal Diseases,[1] has given us a treatise on what may be called the Disease of the Age—a treatise which is at the same time concise and exhaustive. Being the most recent work upon the subjects of which it treats, its pathology is up to the times; while the treatment recommends itself to every man of common-sense. The author speaks from his own experience, and those who read his book will find in it many originali deas which they will be

[1] Renal Diseases: a Clinical Guide to their Diagnosis and Treatment. W. R. Basham, M. D., Fellow of the Royal College of Physicians, etc., etc. Philadelphia: Henry C. Lea, 1870, 16mo, pp. 304.

disposed to accept, so simple, and yet so convincing are the arguments used. The work is an epitome, and as such is invaluable for the medical student who desires, in an abridged form, the results of modern investigation in the pathology and treatment of Bright's disease, and for the practitioner who wishes a book of reference, where he can at any time put his finger directly upon what he wants, without the trouble and loss of time of wading through innumerable details.

The addition, by the American publishers, of illustrations of urinary deposits, is a valuable one. We are learning better every day the increased usefulness of books whose subjects are well illustrated, thus gaining a firmer hold upon the memory of the reader, by impressing upon his mind a picture which does in an instant more than can oftentimes be effected by chapters of the finest print.

In the Journal for November last, we noticed a report by Dr. Woodward, of the United States Army, on the use of various artificial lights in photo-micrography, and we have now from the same indefatigable investigator another report[1] of even greater value. He has applied photo-micrography to the examination of the minute blood-vessels, both in health and disease, with a view of determining the correctness of Cohnheim's observations on the passage of the white corpuscles through the walls of those vessels. The results of these investigations—which have been performed with great care—appear to be on the side of Cohnheim, so far as relates to the fact of the wandering of the white corpuscles. But, very wisely, we think, he does not commit himsef as to the bearing of these facts on the theory of inflammation which Cohnheim based upon them. The preparations from which the photographs were made are preserved in the Army Museum at Washington, and can be examined by any microscopist, though the plates themselves, we think, demonstrate clearly the possibility of the fact as stated above. Dr. Woodward gives the credit of first enunciating this doctrine, which has so largely been

[1] Report on Certain Points in the Histology of Minute Blood-vessels. By J. J. Woodward, M. D., Assistant Surgeon United States Army. Quarto, pp. 8, with eleven photographic plates.

associated with Cohnheim's name, to Dr. Augustus Waller. His experiments were made (as was stated in the obituary notice of him, in our November number, p. 464) twenty-two years before Cohnheim announced his theory, and they were first published in the *Philosophical Magazine* of 1846. Altogether, the report is a most valuable contribution to medicine, and the governmental authorities have done wisely in placing it within the reach of histologists, and of the profession at large.

Dr. Neftel has written a libellus to show that the treatment of nervous diseases has recently made great progress, and, to insure success, it must be based on a knowledge of physics and physiology.[1] To make good his postulate, he gives some account of the physiological and therapeutical action of the constant current upon the auditory, optic, sympathetic, and pneumogastric nerves. He is a devout believer in the teachings of the late Dr. Remak, and quotes largely from his lectures delivered in Paris, in 1864, and afterward published. Dr. Neftel quotes from and refers only to the French edition, not knowing probably that Dr. Clymer's translation of these lectures was published in this Journal, nearly five years ago (vol. iii.).

This little work shows, as far as it goes, full knowledge of what has been done on the subjects treated of—a small part only of galvano-therapeutics—and the author's practical acquaintance with them. Our fear is, that they have been treated of too scientifically, and that the great mass of practitioners will hardly be able to appreciate some of the chapters as they deserve to be. The third chapter, on "the Action of the Galvanic Current upon the Sympathetic," is especially valuable, giving the result of Remak's, Benedikt's, and the author's experience, and confirming Griesinger's prediction that the constant current would prove an invaluable agent in the treatment of disease, when the sympathetic was brought into the sphere of its action.

[1] Galvano-therapeutics. The Physiological Action of the Galvanic Current upon the Acoustic, Optic, Sympathetic, and Pneumogastric Nerves. By William F. Neftel, M. D. New York: D. Appleton & Co., 1871 12mo, pp. 161.

A BOOK of blank forms to aid the busy practitioner in making detailed and systematic records of gynæcological cases, with an appendix of blank leaves, should more than one page be necessary for the history of a case, and tables for the ready analysis of the contents, has been prepared by Dr. Joseph G. Pinkham.[1] Detailed observations of extraordinary cases, and of operations, for which there is not room in the forms, can be given in the blank pages. Dr. Pinkham modestly states it cannot be claimed that it is perfect, and solicits criticism and suggestions. It seems to us to fill most of the requirements, and we cordially recommend it.

DR. JOHN D. JACKSON, of Danville, Ky., has published in sumptuous form an address[2] on the "Black Arts in Medicine." This quaint title suggested to us, before perusal, a history of the astrology and alchemy of the early fathers in medicine, and the impress of such arts on the practice of to-day. But in this estimate we were quite mistaken. By an ingenious perversion of the original meaning of the term the doctor has made, under the form of a scathing satire, a denunciation of the disreputable arts and devices resorted to by the unscrupulous with the purpose of securing patronage. The satire is in the form of a letter, purporting to come from one Dr. Solomon Machiavelli Sharpe, a retired and successful practitioner, to John Charlatan Greene, M. D., a young graduate just starting on his professional career. Unhappily there is too much truth conveyed by this satire, which, *veluti in speculum*, reflects back the habits of very many of our otherwise reputable men. If the public could have as keen an appreciation of the contemptible littleness of these practices as is evidenced by the author of this paper, these *black arts* would soon become the *lost arts* of medicine.

[1] The Gynæcological Record. Prepared by Joseph G. Pinkham, A. M., M. D., Corresponding Member of the Gynæcological Society of Boston; Fellow of the Massachusetts Medical Society. Approved by the Gynæcological Society. Boston: James Campbell, publisher, 1870.

[2] The Black Arts in Medicine. Read before the members of the Boyle County, Lincoln County, and Mercer County Medical Societies, at a meeting held in Danville, Ky., September 13, 1870. By John D. Jackson, M. D. Cincinnati: Robert Clark & Co. 1870.

The superb mechanical execution of this pamphlet, with its heavy, tinted paper, broad margins, and rubricated title-page, is worthy of mention and commendation.

THESE Reports[1] consist of articles upon some of the diseases that cattle-flesh is heir to; that upon the lung-plague by Prof. John Gamgee, M. D., is exceedingly interesting and instructive. The results of examinations of fluids of diseased cattle, made by Drs. Billings and Curtis, United States Army, prove conclusively that these diseases, contagious though they be, do not depend upon the presence of cryptogamic growth in these fluids.

This subject of diseases of the brute creation is a much-neglected one in this country, and we look forward with great interest to the time when medical schools for their study will be established in our midst, and when our horses and cows may be as successfully treated as are now our wives and children. Till that time comes, let Congress, by judicious and generous appropriations, obtain the services of those who have received in foreign countries their education in these subjects.

MR. HEATH[2] is well known as an accomplished anatomist, and in the work before us we find his characteristics faithfully portrayed. As a guide to the student in the dissecting-room we know of no manual superior to, if as good as, this. The text is concise, perspicuous, and accurate, and the illustrations are exceedingly well drawn.

Dr. Keen, who is already favorably known to our readers as an original writer on medical subjects, has rearranged the matter of the work, and otherwise improved it. It is consequently better adapted to the requirements of the American medical student and practitioner than in its original form.

MR. CHRISTOPHER HEATH'S Manual of Minor Surgery has passed to a fourth edition in London.

[1] Reports on the Diseases of Cattle in the United States, made to the Commissioner of Agriculture. Washington: Government Printing-Office, 1869, 8vo, pp. 190.

[2] Practical Anatomy: a Manual of Dissections. By Christopher Heath, F. R. C. S., etc. Edited, with Additions, by W. W. Keen, M. D., etc. Philadelphia: Henry C. Lea, 8vo, pp. 572.

Churchill's late catalogues (London) contain the following new books, together with very many new editions of our standard authors:

A Manual of the Practice of Surgery. By Thomas Bryant, F. R. C. S., of Guy's Hospital. The Science and Practice of Surgery. By Frederick J. Gant, F. R. C. S., of the Royal Free Hospital. Contributions to the Science and Practice of Surgery. By T. Spencer Wells, F. R. C. S., etc. Ovariotomy, illustrated by twelve Plates and numerous Woodcuts. By the same author. A Practical Treatise on the Diseases of Women. By Robert Barnes, M. D. A Hand-book of Stomach and Liver Diseases, with Special Reference to Tropical Climates. By James C. Dickinson. Rheumatic and Strumous Diseases of the Joints. The Lettsomian Lectures for 1869. By William Adams, F. R. C. S. On Deformities: A System of Orthopedic Surgery. By Bernard E. Brodhurst, F. R. C. S. The Medical Works of Francisco Lopez de Villalobos, the celebrated Court Physician of Spain. With Biography and Commentary. By George Gaskoin.

The Anatomical Memoirs of the late Prof. Goodsir have been issued, in two volumes, octavo, by the Messrs. A. & C. Black, of Edinburgh. The work is edited by Prof. Turner.

Dr. J. Matthews Duncan has just published, through the house of the Messrs. Black, of Edinburgh, and Longmans & Co., of London, a new work on "The Mortality of Childbed and Maternity Hospitals."

Memoir of Sir James Y. Simpson, Bart.—The executors of the late Sir J. Y. Simpson are making arrangements for the preparation of a biography, and would feel much obliged by persons possessing interesting letters from him, or interesting information regarding him, sending the same to Robert Simpson, W. S., 28 St. Andrew Square, Edinburgh. All documents sent will be duly acknowledged, carefully preserved, and afterward returned.

Books and Pamphlets Received.—A Contribution to the Medical History of New Hampshire. By A. B. Crosby, M. D. Pamphlet, pp. 32. (From the Author.)

This paper, which was read at the annual meeting of the New Hampshire State Medical Society, June, 1870, is a history of the Medical Department of Dartmouth College, and in a measure is also a biography of some of the principal men connected with that school in the earlier periods of its existence. The profession of to-day know too little of the difficulties and struggles of medical men of a few generations past, and it is well that they should occasionally be told of these things, both by way of incentive to loftier and nobler effort to win fame and do good, and by way of reconciliation to their surroundings and lot in life. Dr. Crosby has done this work well for his own *alma mater*, and has given us a deserved tribute to the memory of Smith, Mussey, Twitchell, and other distinguished physicians, whose names are so closely connected with the early medical history of New Hampshire.

Medical Progress. An Oration on the forty-seventh Anniversary of the Medical Society of the County of Kings. By A. N. Bell, M. D. Brooklyn, N. Y. Pamphlet, pp. 33.

A sketch of the early History of Practical Anatomy. Being the Introductory Address at the Philadelphia School of Anatomy, October 11, 1870. By W. W. Keen, M. D. Pamphlet, pp. 31.

These Addresses are of a kindred nature, and deserve notice from the evident care and research taken in their preparation. Dr. Bell's address is more comprehensive in its scope than that of Dr. Keen, which is devoted specially to the history of anatomical investigation. Both, however, give in a compact form the principal points in the earlier study of medicine, and, by thus bringing into small compass a large amount of material, the original of which is scattered through many volumes, they are worth preservation for reference and study. The busy practitioner will rarely find the leisure to consult such originals, and, as an acquaintance with the history of medicine is essential to the broad culture demanded of the physician of to-day, it is well that the speakers at our societies and public gatherings should occasionally review this important work, and it will be creditable if they do their work as well as it has been done by Drs. Bell and Keen.

Trial of John Reynolds medico-legally considered. By M. Gonzalez Echeverria, M. D. Pamphlet, pp. 47. (From the Author.)

Transactions of the Medical Society of the State of Pennsylvania. Fifth Series. Part II., 8vo, pp. 567. Sewed.

In collating our reports of the Progress of Medicine. we have made free use of these Transactions. The plan of the publication has seemed to us in many respects superior to that employed by the most of our State and local medical societies for their published reports, though we believe it would be better for the profession if the valuable material which is printed in all these reports were made public through the medical journals of large circulation.

The Old Franklin Almanac for 1871. Philadelphia: A. Winch & Co. 8vo, pp. 70.

Vick's Illustrated Catalogue and Floral Guide for 1871. Rochester, N. Y.: James Vick. 8vo, pp. 96.

Catalogues and Annual Circulars of—
Louisville Medical College.
Miami Medical College, Cincinnati.
Savannah Medical College.

Exophthalmic Goitre, with Insanity. By J. B. Andrews, M. D. Reprint from the American Journal of Insanity for July, 1870. Pamphlet.

Partial Paralysis from Reflex Irritation, caused by Congenital Phymosis, and Adherent Prepuce. By Lewis A. Sayre, M. D. Reprint from the Transactions of the American Medical Association, 1870. Pamphlet, pp. 9.

The Origin, Progress, and Present Position of the New York Society for the Relief of the Ruptured and Crippled. Pamphlet, pp. 12.

Forty-fifth and Forty-sixth Annual Reports of the Officers of the Retreat for the Insane at Hartford, Conn. April, 1870.

A Paper on Median Lithotomy, by James L. Little, M. D. Reprint, from the Transactions of the American Medical Association, 1870. Pamphlet, pp. 20.

Reports on the Progress of Medicine.

OBSTETRICS AND DISEASES OF WOMEN.

1.—*Treatment of Metrorrhagia.* [Union Médicale de la Gironde, February, and Practitioner, July, 1870.]

M. Dupierris recommends iodized solutions, by injection, in the hæmorrhages that occur after childbirth, and also as a means of preventing the access of puerperal fever. This remedy produces an excitation of the internal surface of the uterus, which tends to make it contract. It thus aids the uterus in expelling clots, but does not, like the perchloride of iron, act as a direct hæmostatic, or cause the formation of small clots in the mouths of the vessels, which are apt to act as foreign bodies and may become the source of various accidents. He clears out all clots from the interior of the organ, and then injects, with considerable force, a solution of one part of tinct. iodine to two of water and a small proportion of the iodide of potassium. The uterus quickly contracts, and the lochia are sparing and free from bad smell.

2.—*On the Connection between Inflammatory Conditions of the Uterus and its Displacements.* By J. Henry Bennet, M. D. [British Medical Journal, October 1, 1870.]

The extreme tendency, happily, however, now diminishing in this country, to refer most uterine ailments to displacements,

and the too common resort to mechanical and surgical treatment, induce us to give space for the whole of Dr. Bennet's paper which he read at the last meeting of the British Medical Association, in August, 1870:

My intention in reading the present paper is, principally, to introduce an interesting and important subject for discussion to the Midwifery Section of the British Medical Association, the one embodied in the title which I have taken. I have nothing new to advance; my opinions are well known, and have been before the medical profession for more than a quarter of a century; at the same time, I am anxious to state that more extended experience, as years advance, has confirmed their correctness. Nor does it seem to me a work of supererogation to reproduce these opinions here, for antagonistic doctrines—erroneous doctrines, I firmly believe—are very rife, if I may judge by what I see in practice.

I have no intention in this paper to attempt even a sketch of the history of uterine displacements. It would take many times the fifteen minutes allowed me. I purpose to confine myself entirely to the consideration of the influence of inflammation in their production, laying down as a guide certain anatomical, physiological, and pathological data, which to me appear undeniable, and which, if conceded, must decide the question in the sense in which I decide it.

Anatomically, the uterus is not a fixed organ, like the liver or kidneys, bound down by ligaments, as in the former of these organs, and destined to spend its organic life *in situ*. On the contrary, it is a very movable organ, of small size and light weight. In the healthy female who has had no children, it only weighs one ounce or one ounce and a quarter; in a healthy female who has had children, it returns to an ounce and a quarter or an ounce and a half, after each confinement. Its means of sustentation are its ligaments—principally the lateral ligaments, the vagina, and the pressure of the surrounding organs. The support thus anatomically given admits of considerable mobility, especially in an antero-posterior and in a vertical sense, as may be ascertained by a digital examination. The healthy juvenile womb may be pressed by the finger, with ease, into all but any part of the pelvic cavity; indeed, the uterus swings in the pelvic cavity like the body in a hammock, suspended between the natural ligaments. The healthiest uterus in the healthiest woman is lower at night—probably half an inch—than it was when she got up in the morning, through mere gravity.

Physiologically, this extreme anatomical mobility of the uterus is an absolute necessity. When the bladder is full the uterus must give way, be pushed back posteriorly, sometimes to an extreme extent. The digital examination of a woman whose bladder is full of urine demonstrates this fact. On the other hand, when the rectum is loaded, the uterus must give way anteriorly, be pushed forward; the laxity of the lateral ligaments and their stretching capacity render this possible. Thus physiological retroversion and anteversion of the uterus constantly take place under these influences. In pregnancy, the enlarged uterus rises and leaves the pelvic cavity, showing how elastic and ductile the uterine ligaments are to physiological changes. The slight descent or lowering of the entire uterus in the vagina, after the day's walking or standing, may be said to be an illustration of physiological prolapsus.

Pathologically, the uterus presents a peculiarity which pertains to it individually, or which is at least more marked in it than in any other organ of the body. It enlarges more rapidly and more permanently under the influence of inflammation, or indeed of any morbid stimulus, than any other organ. This morbid peculiarity is connected with its physiological

duties and power. Twenty times or more in a woman's life the uterus may enlarge, under the physiological stimulus of pregnancy, from an ounce and a half to thirty ounces or more in the course of nine months; and then, in four or six weeks, go down again to an ounce and a quarter or an ounce and a half. A very slight amount of inflammatory mischief in the entire uterus, or in a limited région, may enlarge it, increasing its weight in the non-pregnant woman, or may prevent entire reduction after delivery. I long weighed the uterus of every woman examined in the dead-room, and never found the weight anatomical when there was any inflammatory lesion, or indeed any morbid condition, fibrous tumor, mucous polypus, or cancerous deposit. The uterus responds to the slightest stimulus, increasing gradually; or after pregnancy it refuses, under morbid stimulus, to descend to the normal size and weight, stopping at eight, six, four, three, two, ounces.

This pathological enlargement is often the result of localized inflammatory conditions, and may be then limited to one region of the uterus. Thus the fundus may be the seat of enlargement, and, less frequently, the anterior region, or the cervix alone.

In all these cases the enlargement and increased weight of a physiologically movable organ like the uterus is followed, inevitably, by displacements. The direction in which the displacement takes place depends on the region of the uterus enlarged. If the entire uterus be uniformly enlarged, the displacement is generally vertical; the uterus falls in prolapsus. If it be, as often happens, the fundus that is enlarged, we have retroversion; if the anterior region, anteversion. I would remark, however, that in my opinion anteversion of the body of the uterus is, generally, in married women, the result of coitus, which drives the cervix into the sacrum, and, acting as a lever on the entire organ, throws the body forward. In unmarried women and in women generally who have had no children, anteversion is often the result of general inflammatory enlargement of the uterus, and of the exaggeration of the normal and congenital crescent curvature of the uterus, which I was the first to discover and point out. An American pathologist has recently made a beautiful experiment illustrating this congenital curvature. He froze the pelvis of several young females, and, onmaking a section, found the virgin uterus curved with anterior concavity, as I described it many years ago.

If the above facts are admitted, the therapeutical deductions are obvious and undeniable. In any case of uterine displacement, the first thing to do is to ascertain whether the uterus is enlarged, and whether there is any inflammatory or other lesion present which can have produced the enlargement, or which can have prevented the normal reduction after delivery. If such morbid condition exist, it should first be treated, and cured, if possible, whether it be general, localized, or internal metritis, laceration of the cervix, mucous-membrane disease, or polypus. That accomplished, Nature alone, under favorable circumstances, with a due allowance of time, will do the rest, fining down the uterus to its natural size; and that attained, the organ will, generally, regain its natural position of itself, like a letter-weigher from which the weight is removed. If it does not, moderate pressure from an uninflamed organ seldom positively requires treatment, as it seldom gives pain or annoyance. I know hundreds of women whose uteri are not physiologically *in situ*, but who know it not, and have no uneasiness. If, however, the displacement persists, from other causes which I have not enumerated, and is a source of discomfort or prejudice, it may then be judiciously treated by mechanical agents, pessaries, etc. Such, however, is not the course usually followed. Other doctrines prevail—doctrines which, although clearly erroneous, are sanctioned by great names both at home and abroad. Uterine displace-

ments are too much studied *per se* independently of the inflammatory lesions which so often produce them. The uterus seems to be considered, like the elbow or knee joint, as capable of being dislocated backward or forward to one side or the other, and as thus capable of mechanical replacement, a doctrine utterly at variance with the anatomical and physiological facts that I have brought forward. As a practitioner, ever since I have been in practice, I have constantly had to take pessaries out of the vaginas of women with more or less severe inflammatory lesions of the uterus, in whom they ought never to have been inserted, at least not until they were cured of these lesions.

Nor is this surprising. In my youth, in 1837, thirty-three years ago, I was clinical clerk for a year to Velpeau at La Charité in Paris. He then paid great attention to uterine diseases, and had his female-ward half full of women thus suffering. During that year, I consider that I learned nothing tangible or useful about uterine pathology from my valued master and friend. It was all anteversion, retroversion, and prolapsus. We never studied and fathomed the cases, and did no real good. Later, at La Pitié, under Lisfranc and Gendrin, I had to unlearn what Velpeau had taught me, and then I began to see that in most instances that displacement is merely a symptom. I continued the friend of Velpeau to the day of his death, but he never got much further in uterine pathology; and, when I broached the subject, used to shake his head, and say in his amiable, jocose way, "Don't let us talk about it; you are a deserter from my flag; you have gone over to the enemy, and deserve punishment." Velpeau's influence, however, in this question, has been great and pernicious on the Continent.

At home, in 1843, I believe, our lamented colleague and friend, Sir James Simpson, published in the *Dublin Medical Journal* a paper on uterine displacements, in which he adopted pretty nearly the same views as Velpeau—those of what I call "the mechanical school." A year or two later, in 1845, he called on me in London, and said that he had procured my recently-published work on uterine inflammation, had read it twice through carefully, on his way to town, and, on his return home, would examine into all the questions I raised. I subsequently heard from him that he had found my descriptions of disease clinically correct. The influence, however, of former views remained powerful in his mind throughout his life; and I found his practice uncertain in this respect. Sometimes he had cleared up those of his cases which I subsequently saw, as regards inflammatory conditions, and sometimes he had not, seeing nothing but the displacement, even when decided lesions existed. I have never before alluded to the opinions of my departed friends: I now do so with all esteem and affection; but they are gone from us; the doctrines which they held are become a part of the history of the profession, and as such they may be alluded to and criticised without disrespect to their memory.

In conclusion, I would recapitulate the views I have endeavored to express in the following terms:

1. I consider that, under the influence of mechanical doctrines pushed to an extreme, uterine displacements are by many too much studied *per se*, independently of the inflammatory and other lesions that complicate and often occasion them.

2. That the examinations made to ascertain the existence of inflammatory complications are often not made with sufficient care and minuteness, as evidenced by the fact that I constantly see cases in practice in which inflammatory lesions have been neglected entirely, and in which the secondary displacements have been alone studied and treated.

3. That inflammatory lesions are often the principal causes of uterine

displacement through the enlargement and increased weight of the uterus or of a portion of its tissues which it occasions.

4. That when such inflammatory conditions do exist, as a rule they should be treated and cured, and then time should be given to Nature to absorb and reduce hypertrophied and engorged tissues before mechanical means of treatment are resorted to.

5. That the relief from the sensation of bearing down which pessaries and bandages give is no real criterion of their being the proper means to use, such relief being often felt when there are inflammatory lesions present, which their presence aggravates.

6. The above statements must not be considered in any way to imply that I do not recognize other causes of displacement of a non-inflammatory nature, such as laxity of ligaments and soft parts, wide pelvis, laceration of perinæum, severe shocks, etc.

3.—*Rupture of Uterus; Recovery.* Reported by T. F. Moses, M. D. [Medical and Surgical Reporter, August 13, 1870.]

On the 27th of February I was called to attend in labor Mary P. V., a German woman of small, almost dwarfish stature. An examination disclosed a breech-presentation, and, as the labor was proceeding normally, and was likely to be tedious, I went away, to return after a few hours. On my arrival in the evening the pains were very frequent and violent, and there was a constant escape of meconium. The os was fully dilated, and the breech firmly impacted in the pelvis. The woman showed no signs of exhaustion, and the presenting part continued to advance slowly, so interference was not deemed necessary. I was particularly struck with the violence of the pains. All at once, during a pain, the woman uttered a sharp, terrible cry, and complained of intense pain over the lower part of the abdomen. The presenting part immediately receded, and it was evident that rupture of the uterus had occurred. A state approaching syncope supervening, I did not immediately deliver the child, and the friends of the patient sent for a priest, thinking her dying, which opinion I shared. After receiving the last offices at the hands of the priest she revived a little, and requested me to relieve her, if possible, from her agony. I stated to her the small probability of her recovering, and proceeded at once to deliver; passing my hand through the rent in the anterior wall of the womb, and finding the feet in the abdominal cavity I brought them down separately, and soon completed the delivery. Only the lower part of the body of the child had passed into the abdominal cavity. The rent extended from the fundus quite through the os, and communicated with the bladder. After accomplishing the delivery, I introduced my hand again into the womb to make sure that no loop of intestine was entangled in it, and at the same time removed a large clot.

The child, which was a finely-formed boy of more than twelve pounds' weight, was of course dead. My only idea now was to make the poor woman as comfortable as possible during the remaining hours of her life, and I administered at once hydrate of chloral in solution, thirty grains, leaving a weaker solution to be given at intervals, in order that its influence might be kept up. Next day I found the abdomen enormously distended and tympanitic; pulse 130, and the face pinched and expressive of great exhaustion. Continued the chloral, and ordered turpentine stupes over the abdomen. Patient dozed most of the time during the day, but was easily roused. The following morning the abdomen was still distended, but less than on the previous day, and the pulse had fallen to 80!

Twenty-four hours later there was a still further improvement, and the

abdomen was softer and less painful under pressure. The next day, seventy-two hours after the delivery of the child, there was such a marked improvement that I considered the patient out of danger, and from that time on she continued to improve so that in three weeks' time she was about her usual avocations, suffering only from debility and the constant dribbling of urine from the fistulous opening in the bladder.

The patient was advised to go to the Cincinnati Hospital and submit to an operation; but, fearing such a procedure, she applied to another practitioner for relief, and was treated for a long time for incontinence of urine. Finding no benefit, as a matter of course, she has finally followed my advice, and is now (July 15th), an inmate of St. Mary's Hospital, Cincinnati. The result of the case I have not yet learned.

Two things are worthy of note in this case: recovery after such extensive laceration of the uterus, and the seemingly beneficial effect of the chloral hydrate in subduing extensive peritonitis.

4.—*Cæsarean Section after Death of the Mother; Child saved.* [Lancet, July 16, 1870.]

Our readers will recall a similar case reported by Mr. Brotherston, of Edinburgh, and quoted in this Journal for October, 1868.

Dr. Beckmann published in the *Berliner Klin. Wochenschrift* of December 20, 1869, the case of a woman, aged twenty-five, who, in the eighth month of pregnancy, died of apoplexy. With the consent of the husband, the Cæsarean operation was performed within five minutes after the mother's death, and a male child, weighing hardly four pounds, extracted. It was seemingly dead, but by dint of persevering efforts at artificial respiration life was recalled; and, by means of breast-milk obtained from a neighbor, the boy did well, and has been frequently seen by Dr. Beckmann since March, 1867, when the operation was performed. A similar case has been published by Dr. Ploss in *Monatschr. für Geburt. und Frauenk.* of August, 1869.

5.—*New Operation of Embryotomy by the Wire-Ecraseur.* Abstract of a paper read by Dr. Robert Barnes at the British Medical Association, August, 1870. [British Medical Journal, October 1, 1870.]

Dr. Barnes demonstrated his new operation of embryotomy by the wire-écraseur, using a rachitic pelvis measuring about two inches in conjugate diameter, and an ordinary-sized fœtus. The head being perforated, he twisted off a portion of the parietal bones by his craniotomy-forceps, the object of which proceeding is to destroy the arch of the cranium and the sphericity of the head. This makes the throwing the loop of the wire over the head more easy, and obviates its riding off when the screw is worked. It was seen that the wire loop could be passed through the smallest chink, and, when it had seized the head either over the lower jaw or occiput, that it was instantly buried in the skull when the screw was worked. In this lay one great superiority over all other methods of embryotomy, there being no contusion of the mother's structures, all force being expended upon the fœtal head. The wire went through the base of the skull without difficulty, making a clean bisection of it. The free section being taken away by the craniotomy-forceps, the portion remaining attached to the spine was then seized by the craniotomy-forceps and extracted without the least resistance. Dr. Barnes said it would be quite as easy to operate in a pelvis much smaller, and, if necessary, to make two or more sections of the head. The extraction of the shoulders and trunk was

effected by taking off each arm at the shoulder by hook or scissors, cutting through the ribs with scissors, so as to make the trunk collapse, and then extracting by craniotomy-forceps. The whole operation was completed in less than half an hour. Dr. Barnes expressed his conviction that, provided there were room at the outlet of the cavity of the pelvis to allow of manipulation, there was hardly any degree of contraction at the brim that would baffle this operation.—Dr. Keiller (Edinburgh) asked Dr. Barnes if he had performed the operation frequently.—The president had never done it at the bedside. He had performed it before his classes; but he was confident that it was feasible. Dr. Keiller saw a very great difficulty in performing the operation at the bedside. He could not imagine that the head of the child could be broken by the operation which Dr. Barnes had described. He knew the difficulty of extracting a child from a narrow pelvis; and he said that the operation of the *écraseur* could not possibly deliver a child from a narrow pelvis, on account of the pressure of the soft parts and the condition of the mother. Generally, in cases of narrow pelvis, they had to contend against a contracted uterus; and the great difficulty was to get a sufficient quantity of bone extracted. The objection to the wire-*écraseur* was, that it was very apt to displace the head. He did not think the operation would be safe. The great difficulty was the base of the skull; and with a small pelvis it was difficult to keep the soft parts in the least possible diameter. He would have been glad if Dr. Barnes had told the members of a case successfully performed by the *écraseur.*—Dr. Gibson said that, in an operation such as Dr. Barnes had performed, he would suggest that it was peculiarly necessary that the chin be brought a little down, in order that the base of the cranium might be readily brought through. In removing the head they would get a better slice by first breaking through the occiput.—The president was persuaded that the operation was easy. One recommendation was, that it entirely saved the mother's parts. When the wire was brought over the child's head, the mother's parts were not injured. He thought it strange that an experienced operator should think it necessary to bring down the occiput. When once the base was perforated, there was nothing to resist extraction.

At the same meeting, Dr. Keiller, of Edinburgh, presented to the Society some instruments which he had used in embryotomy, and made some remarks upon this operation:

He commenced by stating that, although he had not formally announced his intention of offering any special communication to the meeting, he was induced to bring the subject of embryotomy before the Section, partly from what had occurred on a previous day, but principally in consequence of having brought several embryotomy-instruments and casts taken from cases in which the diminution of the head was required. He would be glad if the members present would bear with him while he as briefly and practically as possible offered a few remarks on the very important subject of embryotomy-appliances, and, if time and patience permitted, referred to and exhibited one or two other instruments which were on the table. He had had frequent occasion to test the various forms of craniotomy-instruments. He formerly reduced and extracted the child's head by the ordinary means of perforation and subsequent extraction—namely, the perforator, crochet, lions, and various other kinds of craniotomy-forceps (several improved forms of which he exhibited); but more recently he had preferred and adopted the operation of cephalotripsy in such cases, as he found it to have advantages which craniotomy did not possess. The casts now exhibited were three in number; each was illustrative of a special case, which he briefly described. On one of the casts the actual cephalotribe used was

still attached to the head in the position and direction as applied during the operation. The cast of the head and cephalotribe was taken so as to be permanently useful for teaching purposes. In the case referred to, turning was first had recourse to, under the impression that the head might afterward be safely extracted; but, this failing, it was found necessary to perforate the head in the ordinary way through the occiput. The force subsequently employed, with the view of bringing the head through the contracted brim, led to the separation of the body from the head, which was left *in utero*, and was afterward removed by means of the cephalotribe. He had in several other instances occasion to remove the fœtal head, left *in utero*, by forcible detruncation; and he considered it one of the most difficult operations in obstetric practice, from the extreme mobility of the detached head, and the difficulty of grasping it and contracting it in the proper diameter; which was done, however, in the present case, by the cephalotribe. The second cast exhibited the cephalotribe applied over the compressed head in the most efficient direction. The third cast was that of a still more recent case; and it would be observed that the blades of the applied cephalotribe were considerably twisted, their edges being turned up and projecting in an unusual manner beyond the surface of the crushed head, demanding the greatest care during the stage of extraction, which Dr. Keiller, as a rule, always followed up immediately after crushing the head. Notwithstanding the twisting of the instrument, the crushing of the head was fully accomplished. In this case, a different form of instrument from the others exhibited was employed, it being constructed and jointed so as to admit of the direct apposition of the two blades, as in the more ordinary cephalotribe, or of one blade being applied and locked shorter than the other, which was the mode of using it in the present case. The object in view was to diminish the head to the greatest extent, by bringing the unequal extremity of the instrument closer; and the curved point of the shorter blade was received in the curve of the longer. The advantage presumed to be derivable from this arrangement of the blades was the diminution of the bulk of the instrument, as well as that of the head. This result was not obtained, however, in the present case, as it was found that this construction of the instrument allowed the blades to pass each other so as to produce the twisting observed. He was induced to test this instrument by the request of the late Sir James Y. Simpson, who had suggested this alteration of its construction and mode of application. In the first case, the mother made a speedy recovery. In the second case, although an inflammatory attack occurred, followed by pelvic abscess, perfect recovery took place. The third case, which occurred only a week or two ago, was also followed by inflammatory symptoms, from which the patient was slowly recovering. In all the three cases, the continued and forcible use of the long forceps had been tried previously to cephalotripsy being had recourse to, which may account for the inflammatory symptoms referred to. Dr. Keiller exhibited various instruments along with the cephalotribe which he was in the habit of using. It was the so-called *Edinburgh instrument*, introduced by the late Sir J. Y. Simpson, whose name must remain deservedly associated with many other useful obstetrical appliances. It is of simple construction, readily applied like an ordinary pair of long forceps, which it somewhat resembles; and its ample crushing power renders it well adapted for such cases as usually occur requiring operation. Dr. Keiller, in again referring to the method recommended by Dr. Barnes, consisting of the application of a wire-*écraseur* in diminishing the fœtal head, expressed his intention of giving it a fair trial on the first fitting occasion, although he had considerable doubts of being able to apply it in any degree so speedily and so dexterously on the living body as Dr. Barnes had done in his experiments on the dead fœtus in the dry pelvis.

6.—*The Influence of Chloral on the Pain of Parturition.* [Edinburgh Medical Journal, August, 1870.]

Mr. E. Lambert, late House Surgeon of the Maternity Hospital, Edinburgh, reports in detail eleven cases for which chloral was administered during labor. It is imperative, he declares, that the patient be surrounded by conditions tending to perfect repose of mind and, body; and when there has been great previous excitement, we must proceed very cautiously. For the attainment of so delicate a result as anæsthesia—"thus far and no farther"—great care is required, and we must do with the chloral as we do with chloroform, administer it tentatively by fractional doses.

The following conclusions are arrived at:

1. Chloral is an agent of great value in the relief of pain during parturition.

2. It may be administered under favorable circumstances during and at the close of the second stage, with the result of producing absolute unconsciousness, in the same sense in which we understand unconsciousness under chloroform.

3. When thus given successfully, it has this advantage over chloroform, that it requires no interference with the patient.

4. It is desirable to retain chloroform in the position which it at present occupies in midwifery, and to reserve for the agency of chloral the first stage of labor. If, however, chloral, or some agent having analogous properties, is found successfully to relieve the pain of uterine contraction, the use of chloroform will be restricted to a lesser period of the duration of labor, or to the facilitation of manual or instrumental interference.

5. It is demonstrated that a labor can be conducted from its commencement to its termination, without any consciousness on the part of the patient, under the sole influence of chloral.

6. The exhibition of chloral in nowise interferes with the exhibition of chloroform.

7. The proper mode of exhibiting chloral is in fractional doses of fifteen grains every quarter of an hour until some effect is produced; and, according to the nature of that effect, the further administration is to be regulated. Some patients will require doses of ʒj; and it is better to produce an anæsthetic effect by ʒiij given in the space of two hours than by ʒj given singly.

8. The effects of chloral are continued beyond the period of completed parturition, and the repose experienced by the patient after her labor is one of the favorable circumstances to be noted in considering its application to childbirth.

9. Any stimulating effects, in the form of general excitability, occasionally observed during the administration, have passed away very rapidly.

10. Chloral not only does not suspend, but rather promotes uterine contraction, by suspending all reflex actions which tend to counteract the incitability of the centres of organic motion.

11. Labors under chloral will probably be found to be of shorter duration than when natural, for unconscious contractions appear to have more potent effects than those which are accompanied by sensation of pain.

12. Experiments are required in order to determine whether there exists the same antagonism between ergot and chloral as is known to exist between strychnia and chloral.

13. The general conditions under which chloral is to be administered are the same as those which regulate the administration of chloroform, and the rules laid down by Sir James Simpson, in connection with this subject, must be rigidly adhered to.

7.—*Tumor of the Pelvis, complicating Labor.* By Dr. COPEMAN. [British Medical Journal, October 22, 1870.]

The author read a paper upon this subject, at the last meeting of the British Medical Association, of which the following is an abstract:

After referring to the extreme danger of this form of complicated labor, the author said that it was not so rare as might be thought, and referred to a number of cases that had been collected by Merriman and others. He then proceeded to relate the particulars of two cases that had come under his own observation. In the first case, the tumor occupied the posterior portion of the pelvis. Delivery was effected by turning. The mother died on the third day. In the second case the tumor, which was hard, firm, and immovable, was attached by a broad base to the left side of the pelvis. This case was also delivered by turning, but with extreme difficulty, on account of the size of the tumor. The patient made a good recovery. With regard to treatment in cases of this kind, Dr. Copeman remarked that he would recommend puncture of the tumor, but only when it could be ascertained that the contents were semifluid or soft enough to be partially evacuated. In other cases, he considered turning to be the preferable practice. The president said that all would admire the courage and perseverance which brought about so successful a result in the second case described. He thought that Dr. Copeman had, probably unintentionally, omitted mention of a method of treatment of such cases, sometimes applicable, viz., the pushing of the obstructing tumor out of the pelvis and thus allowing the descent of the head. Dr. Playfair said that Dr. Copeman had not alluded to what was the chief cause of danger in labor complicated by tumor. In 1867 he (Dr. Playfair) had read a paper before the Society on the Treatment of Labor complicated by Ovarian Tumor, in which he had collected the details of all the cases of this complication he could meet with, amounting to fifty-seven in all. Of these, thirteen had been left to Nature; that is, the tumor had been sufficiently small to admit of the child being squeezed past it. Of these thirteen cases, very nearly one-half had proved fatal to the mother. In favorable contrast were the nine cases in which the tumor had been punctured, and in which, therefore, the tumor had collapsed, and had not been subjected to pressure; since every one of them had terminated favorably. The explanation of the great mortality in the former case was, no doubt, the contusion and pressure to which the tumors had been subjected, which set up a low form of diffuse peritonitis. Possibly this might have been the cause of death in the first of Dr. Copeman's cases. The inference from these facts seemed undoubtedly to be, that by far the best way of treating such cases was to puncture the tumors when they had fluid contents, and this even if there seemed room for the child to pass; and, even in cases where the tumor seemed solid, an exploratory puncture should be made before any thing more formidable was done, as tumors apparently solid had often been found to contain fluid. Dr. Protheroe Smith said that it was frequently found that tumors obstructing delivery were cystic or subfascial deposits of serum, blood, or pus; and in such cases he recommended the puncture of the tumor by means of his needle-trocar. In a case lately operated on in the Hospital for Women, he had evacuated by means of it almost an ounce of

thick pus from a tumor of the size of an orange, growing from the back wall of the vagina in a patient in her sixth month of utero-gestation. The operation was only like the prick of a pin, and required no after-treatment. Dr. Barnes said that each case must be dealt with according to its individual features. It was necessary to consider the size, position, structure, attachments, firmness of the tumor, and its relations to the child. If the tumor were movable, and could be pushed out of the way, by all means do it; but in many cases this was impossible. It must be ascertained if it contained fluid; and, if so, its bulk must be lessened; or possibly the tumor might admit of being removed altogether. To obviate the great danger to which Dr. Playfair had referred—that of crushing the tumor by the passage of the child—it was necessary, when the tumor could not be reduced, to reduce the bulk of the child; and in extreme cases, as a last resource, he recommended Cæsarean section. He had recently seen a case where a woman died of septicæmia, the result of the pressing of the tumor against the walls of the pelvis. Dr. Madge had attended a case where a large fibrous tumor had prevented the descent of the child's head. It was first punctured, and then, with great difficulty, pushed above the brim. The patient afterward died of peritonitis, the seat of puncture showing signs of being the starting-point of the disease. He mentioned this as an argument against the too-free employment of the operation.

8.—*Some of the Dangers attending the Use of Tangle Tents.* [Edinburgh Medical Journal, August, 1870.]

Dr. Lauchlan Aitken, in commenting upon the accidents that may follow the use of laminaria tents, says:

I do not wish to imbue any one with the notion that the danger attending their use is so great as to prohibit us from ever having recourse to so effectual a method of diagnosis and treatment. On the contrary, I am so fully aware myself of their value in proper hands, that the accidents which I have related have only impressed me with the necessity of adopting some means to confine such unfortunate events within the narrowest limits; and since I began to employ the precautions I shall immediately detail—precautions which are not given in any of the ordinary English text-books—I have never had any worse result from the use of the tents than the production of slight and transitory forms of cervical catarrh. Those precautions are chiefly:

1. The non-employment of the tent, so long as we are convinced that there exists any endometritis, or any recent perimetric inflammation, of whatever nature it may be.[1]

2. Tents ought only to be used in the intervals between, never (except under the most urgent circumstances) either during immediately before, or immediately after, a menstrual period.

3. The greatest care must be taken in the introduction and removal of tents to avoid any violence or force. Any bleeding caused at either time ought not to be interfered with unless it become serious.

4. The tent should only be used when the patient can remain recumbent from the moment of its introduction to a period after its removal, which varies with each patient. This period ought never to be less than twelve hours, and should usually be much longer.

5. If the patient complains of pain from the action of the tent, an opiate of some kind—a suppository of morphia often suits—a dose of chloral, or

[1] To this head we ought to add that it is never very safe to use tents where there has existed any previous perimetric inflammation which has left bad effects behind, either adhesions, for instance, or chronic inflammatory products.

warm-water injections, ought to be employed to diminish or relieve it, and thus prevent that restlessness which the pain will inevitably cause, and which is the surest means of producing inflammatory action in the womb or adjoining serous membrane and cellular tissue.

6. If successive tents require to be employed, it is much safer to allow an interval of twelve hours to elapse between each. A greater interval even would be preferable; but the cervix often closes up rapidly after its dilatation, and if we were to wait much longer we should frequently have to begin *de novo*.

7. The tangle tent is fully expanded, and ought to be withdrawn, in eight to ten hours after its introduction.

9.—*Removal of the Uterus and its Appendages.* By M. Pean. [Gazette des Hôpitaux, No. 143, 1869, and Edinburgh Medical Journal, March, 1870.]

The following short notice of a remarkable operation, performed by M. Pean, the subject of which was shown to the Academy of Medicine in Paris, at its meeting on December 8, 1869, is from the pen of Dr. Revillout:

The tumor is multiple, containing, 1. A very large cyst of the left ovary. 2. The uterus itself hypertrophied, containing a cyst, and extending up as far as the umbilicus. 3. A fibrous tumor of the right ovary, and a cyst of the right Fallopian tube. . . . Before the operation, M. Pean had diagnosticated the existence of a movable fibrous tumor, independent of the ovarian cyst. He had also made out by vaginal examination that the uterus was hypertrophied, but he did not know to what amount, and could not make this out on account of the adhesions which bound the tumors to each other.

When the cyst of the left ovary became visible through the incision in the abdominal wall, M. Pean began to remove it in his usual manner, stopping the hæmorrhage by long cauteries, heated to whiteness. After having got out a large part of the cyst, he arrived at the uterus, which he found to be greatly enlarged, soft, fluctuating, and everywhere adherent. These adhesions were very vascular, and could not be broken down without excessive hæmorrhage, which even the cauteries failed to arrest. In such circumstances, no resource remained but to remove the diseased uterus along with the other tumors. This M. Pean did not wish to do, through the neck of the uterus, as it, excessively hypertrophied, was as large as a fist. He preferred to carry the section through the vagina itself, and he succeeded in passing across the vagina from before backward, and through the abdominal wound, a double thread, by which he tied the tumor in two halves; the one on the left side secured the great ovarian cyst, the other one included all the vagina corresponding to the uterus, and isolated, besides that organ, the right ovary and Fallopian tube. After having tied the two ligatures, M. Pean cut off all the tumors close above them, and then by strong pulling brought the pedicle (such as it was) to the abdominal wound. This he did not close at the point opposite to the pedicle. Three india-rubber tubes were passed down to the bottom of the cyst to allow escape of discharge. A good recovery took place.

10.—*Two Cases of Perforation of the Uterus by a Sound.* By Dr. Alt, Assistant to Obstetrical Clinique at Erlangen. [Berliner Klinische Wochenschrift, October 17, 1870.]

Dr. Alt remarks that it has of late been observed that the uterine sound may occasionally be introduced to a depth much beyond what is normal,

and this too when the uterus is not enlarged. Matthews Duncan and Hildebrandt believe that in such cases the sound passes into a pathologically widened tube, while Höning is inclined to the opinion that a perforation of the uterine wall allows the sound to pass into the peritoneal cavity. Two cases, occurring in Prof. Schröder's clinic at Erlangen, throw some light upon the subject.

The first case was that of a primipara, twenty-six years old, delivered with forceps; soon after, puerperal fever set in. One month later, on vaginal examination, a tumor was felt on the right side, extending from uterus to pelvic wall; on the left side a second tumor, large and ill-defined, unconnected with the uterus. The sound was introduced to a depth of two and a half inches; slight pressure, not amounting to force, being exerted, it passed into a depth of six and a half inches, the end being distinctly felt through the abdominal walls; when withdrawn some blood was observed. No pain was experienced, either during the operation or afterward, and no peritoneal symptoms developed. One month later the tumors had decreased and the fever disappeared; at this time the sound could be passed to a normal depth, but no more.

The second case was also a primapara, twenty-four years old. The pelvis being deformed, labor was brought on by artificial means. Immediately after confinement, puerperal fever set in, with metastatic abscesses and inflammation of various joints; the fever continued four months. Five months after confinement the uterus was very small; in the right iliac fossa was a large and sensitive tumor. In the middle of the fifth month the fever had abated, but would increase and decrease at irregular intervals. In the seventh month the temperature rose to 104° F., and upon examination the uterus was found small and relaxed, not bound down, its cervix normal. The sound was introduced, and, slight pressure being exerted, it passed in to a distance of five inches from the external os. The temperature rose slightly, the pulse, as on the preceding day, was 148 and small, abdomen not sensitive to pressure. On the following day the temperature fell to 102.1° F.; four days later, patient left her bed.

That in both of these cases the sound perforated the wall of the uterus there can be no doubt; the puerperal fever had in both cases rendered the uterus atrophic, and brought about a degeneration of its muscular tissue. That this is the effect of puerperal fever, where it is long and severe, is a well-known fact. In the second case the uterus was distinctly felt to be atrophic and flabby. Prof. Martin, of Berlin, reports a case in which, within a few months after the confinement of a tuberculous patient, the sound passed in to a depth of seven inches, and was distinctly felt through the thin abdominal walls. No blood was to be seen, and neither pain nor inflammation followed. The woman subsequently died of tuberculosis, and the autopsy revealed a perforation of the left angle of the uterus. No traces of a recent peritonitis were found; while, on the other hand, the uterine walls were in a state of fatty degeneration, and were easily torn.

In all of these cases no force was used, and no peritonitis followed.

11.—*External Pressure to the Uterus in Labor.* By W. S. Playfair, M. D. [Lancet, October 1, 1870.]

In 1856 Von Ritgen suggested the employment of external pressure on the uterus as an adjuvant in cases of powerless labor. In 1867 Kristeller carried the suggestion into practice, and published a number of cases in which he had found it of use.

The object was, to *push* the presenting part through the pelvic canal in cases in which the forceps would otherwise be required to *pull* it through; to apply, in fact, a *vis a tergo* instead of a *vis a fronte.*

This proposal has met with but little attention in this country; and the only author who, as far as I know, refers to it, is Dr. Barnes, in his recent admirable work. He says with regard to it: "This resource, then, should not be lost sight of. In certain cases it may obviate the necessity of using the forceps; or it may stand you in good stead when instruments are not at hand."

It is certain that the advantages to be derived from external pressure are not yet widely known or recognized; and as I have now received very material assistance from it in many cases of lingering and powerless labor, I believe it may not be without interest to state briefly the result of my experience on this point, especially as I do not know of any published cases in this country in which its use has been described.

The class of cases in which external pressure is likely to prove servicable is of very frequent occurrence—viz., in which the presentation is natural, and the pelvis roomy, but in which delivery is retarded simply from deficiency or absence of uterine contraction. These are the cases in which resort to the forceps is so often essential, in which the head has passed well into the pelvis, possibly descended as low as the perinæum, and in which apparently but one or two good pains are required to complete the delivery.

Firm pressure, applied under such circumstances, may act in two ways: First, and most commonly, it may merely stimulate the sluggish uterus to increased exertion, just as firm pressure after delivery will cause a relaxed uterus to contract. In this way, pains that are feeble and ineffective may be rendered strong and useful, and a natural termination may result when artificial assistance might otherwise be required. I have of late been frequently in the habit of thus stimulating the uterus, and I feel certain that I have in many instances greatly shortened the progress of a labor that threatened to be long and tedious. It is, indeed, often curious to observe how rapidly the pains increase in force and duration, under the stimulation of gentle and steady pressure at the commencement of each pain. The following case may be taken as a good example of the beneficial effect of pressure applied in this way:

——, the mother of several children, about thirty-five years of age. Labor commenced at noon on the 23d of February, 1868. The pains were at long intervals, feeble, and of short duration. At 3 A. M. on the morning of the 24th the membranes had been ruptured for several hours, and the os was fully dilated. The pains were now more frequent and regular, but they had no effect in causing the head to pass through the brim. It remained partially engaged, but always receded in the intervals between the pains. After waiting for some time, it seemed as if the forceps would be required. Von Ritgen's method was now tried. The patient being laid on her back, and the hands being spread out on the sides and fundus of the uterus, firm downward pressure was made in the axis of the brim at the commencement of each pain. The good effects of this manœuvre were very striking. The first pain was manifestly increased in strength and duration, and the head was felt to advance decidedly as it was pushed down. The contractions now increased greatly in force, and in about six pains the head was expelled. It was in the third position, and the rotation of the occiput forward was readily made out as it descended. The child was of immense size, and living. The mother made a good and rapid recovery.

This may be taken as a typical example of the most usual effect of pressure—viz., to stimulate the uterus to increased exertion; and I believe it to be a far more effective and safe agent for this purpose than ergot.

Secondly, it is sometimes possible to push out, as it were, the fœtus in the entire absence of uterine pains. I presume that cases suitable for this must be rare, and that, as a rule, extraction by the forceps is to be pre-

ferred. Still, the following case may be taken as proving the possibility of occasionally effecting delivery in this way:

——, aged twenty-five, a lady of great delicacy of constitution, was pregnant of her third child. She had suffered a good deal during gestation, was immensely distended with liquor amnii, and for some months had been almost entirely confined to her sofa. Her labor commenced on the 10th of August, 1870. During most of the day she had feeble pains, and at long intervals. At 10 P. M. the os was only slightly dilated, and the head was felt to be presenting. The pains got somewhat stronger at 3 A. M., and at 4 A. M. the membranes ruptured, an enormous quantity of water being discharged. At 6 A. M. the os was fully dilated, and the head was engaged in the brim in the first position. The pains were now scarcely worthy of the name. At short intervals there was a barely perceptible hardening of the uterus, which disappeared almost as soon as it was felt, and had no appreciable effect on the presenting part. I was informed that ergot had been administered with advantage in a former labor, and I gave her a full dose without any good result. After waiting till 11 A. M., I began to despair of any progress. The slight contractions previously felt had disappeared, or nearly so, and I made up my mind to apply the forceps.

The husband, however, objected so strongly to any instrumental interference that I determined to try the effect of pressure, although, in the absence of uterine contractions, I scarcely expected any beneficial results.

Spreading the hands over the uterus in the usual way, I made firm downward pressure at intervals of from five to ten minutes. The effect was more favorable than I had anticipated. With each application of the pressure the head was felt to descend, and in about three-quarters of an hour it was distending the perinæum. Now for the first time some slight contraction was felt, and the head was soon expelled. The child was born alive, and the mother made an excellent recovery.

A case of this sort is no doubt quite exceptional, and I should generally prefer under such circumstances to apply the forceps. Still it may serve to illustrate Kristeller's statement that external pressure alone is capable of effecting delivery. It is, however, as an adjuvant in cases of lingering labor, and as a means of stimulating a feebly-contracting uterus, that pressure promises to be of service. I need hardly add, by way of caution, that gentle but firm pressure in a proper direction is to be used, and that all rough handling of the uterus is to be avoided. The pressure can be most readily applied with the patient lying on her back, but this is by no means essential, and I have constantly used it in the ordinary position on the side, and without disturbing the patient.

DISEASES OF CHILDREN.

1.—*The Treatment of Ranula.* [Medical Times and Gazette, June 4, 1870.]

The treatment of ranula, which seems to be one of those subjects ever open to discussion, was brought before the Paris Surgical Society at its last meeting, in the shape of a case of congenital ranula occurring in an infant, related by M. Blot. The tumor, which was perfectly transparent, and large as a hazel-nut, pushed the tongue upward and impeded its movements, especially during sucking. After hesitating as to which of the different procedures he should adopt, M. Blot traversed the tumor with a tenaculum, and, drawing it out, excised it; and at the end of three week the infant remained cured of its malady. M. Marjolin, at the commence

ment of his practice, was an advocate of excision, but he had renounced it in consequence of the more or less serious hæmorrhage he had in several cases seen it give rise to, requiring in some of these the actual cautery for its arrest. Since then he has employed a seton of one or more threads, which is allowed to remain *in situ* for a fortnight, a month, or even longer, Suppurative inflammation is set up, which leads to obliteration and a radical cure. When the children are some years old, he renders the seton more irritating by soaking the threads in tincture of iodine. M. Marjolin states that his practice is unattended with any inconvenience, impeding neither sucking nor feeding, and has never needed to be repeated. M. Chassaignac, however, does not approve of the seton, as it sometimes gives rise to extremely violent inflammation, tumefaction of the tissues, and excessive suppuration—inconveniences, indeed, which may attend the seton applied in any part of the body. He prefers the application of a small drainage tube, which, traversing the tumor, may be secured to it, and which gives rise to only a very moderate degree of inflammation. As to excision, he has never had resort to it, in consequence of his fear of the hæmorrhage it might give rise to. M. Blot observed that the bleeding was not to be feared in the case of transparent tumors like the one in question, and in which he has never found it attended with this or other inconvenience. M. Forget remarked that the procedure employed should vary according to the nature of the case and the age of the patient; and in transparent congenital ranula he agrees with M. Blot in regarding excision as the best procedure. M. Giraldes also advocates it in the case of new-born infants as the most simple, rapid, and efficacious means of treatment, and prefers it much to the seton, which is very inconvenient. As a general rule, it does not give rise to any serious bleeding, especially when this is arterial, which usually stops of its own accord through the retraction of the walls of the artery. It is the venous hæmorrhage which is most to be feared and difficult to arrest, because its source is not discoverable. In his own practice, M. Giraldes has found excision the best operation for children under two years of age, drawing out the tumor to be removed by means of a claw-forceps, or, in the absence of this, a tenaculum or a thread passed through the tumor by means of a curved needle. M. Guéniot has cured a ranula the size of a hazel-nut, occurring in a child a few weeks old, without excision, or, so to say, without an operation at all. While about to perform excision, which he, too, regards as the best procedure, he burst the thin walls of the little sac and discharged all the fluid. It was reproduced, but, after having been discharged again in a similar manner, the cyst never recurred. As to hæmorrhage following excision, he believes that we should make the same distinction as we do with regard to the frænum linguæ, the incision of which is sometimes attended by hæmorrhage. The frænum is sometimes extremely delicate and transparent, and then no effusion of blood attends its incision; but at others it is thick and fleshy, and then even a dangerous hæmorrhage may occur. It is precisely the same with ranula. M. Guyon drew attention to the fact that suppurative inflammation set up for treatment of ranula might extend by the dilated Wharton's duct to the salivary gland and give rise to very mischievous consequences; excision should therefore be preferred.

2.—*Anomalous Cases of Stone.* [Medical Record, July 15, 1870.]

At the June meeting of the Pathological Society of this city, Dr. Detmold presented a specimen, and gave the following history of the case to which it belonged:

On the 20th of April, a boy aged three years was brought to the clinic

suffering with all the symptoms of stone in the bladder. A small bent silver probe was introduced and a stone discovered. This was followed by a tolerably large-sized staff, which passed in with perfect ease. Several army surgeons who were present likewise felt and recognized the existence of the stone. Dr. D. then proceeded to operate by the lateral section, but when he cut into the bladder no calculus was to be found. Before commencing to operate he had occasion to remark that the case was in some of its aspects a little different from ordinary ones, inasmuch as the staff did not bring out the usual metallic ring, but in its stead a sensation as if it encountered some sort of incrustation, and that he was sorry to say that he had neglected to bring a calculus with him in case he should fail to get one from the operation. The finger being introduced with a negative result, the sound was again employed, when he found, just above the incision, the same sensation of grating against some hard substance. He then made an incision upward with a grooved knife, then with the finger-nail he scratched a little, and a stone weighing seven grains fell into the wound.

He remarked that this case might have been an example, perhaps, of many in which surgeons had failed to find the stone after a clear diagnosis had been made, never thinking of looking for the calculus in the membranous portion. It was remarkable that in a child of that age so large a staff should pass in without resistance.

As a companion to the former, he exhibited another stone, removed by operation from a boy brought to his clinic on the 1st of June. The patient was fifteen years of age, and was laboring under all the ordinary symptoms of stone in the bladder. After the patient was placed upon the table the doctor proceeded to introduce a metallic staff, and, feeling at the same time a hard body in the scrotum, remarked to the class that one of the testicles was very much indurated, accounting for the condition by the constant straining to which the patient had necessarily subjected himself. The sound, however, was suddenly arrested in its progress, and could not be made to go any farther. Examining the hardened body with more care, he found that instead of its being a testicle it was in reality a stone of large size, which hung down into the scrotum far enough to enable him to isolate it by a grasp. It was situated in the bulbous portion of the urethra, and was removed by an incision direct upon the part, through which a portion of the corpus cavernosum made its appearance. Both of the testicles had been drawn up in the abdominal ring. The calculus weighed half an ounce.

Both the cases perfectly recovered. In concluding his remarks upon these, he referred to the strange fact that two such unique ones should present themselves within two weeks of each other.

3.—*The Use of Raw Meat in the Diarrhœa and Dyspepsia of Children.* By Robert Druitt, M. R. C. P., etc. [Medical Times and Gazette, July 2, 1870.]

I learned the use of raw meat as a remedy for diarrhœa, from the late estimable Prof. Trousseau, during a visit paid to his clinique at the Hôpital des Enfans Malades in 1851. Since that time I have had abundant opportunities of proving its efficacy, and, although I know that it is largely used by some physicians, it may not be unseasonable at the present time to call attention to it, and to encourage its more general use.

Let me begin with a few words on the mode of preparing it. The meat used may be either mutton or beef—say a titbit of the loin of mutton, or of the fillet or other tender part of beef. This must be submitted to a process either of pounding, or of scraping, so as to get out the red soft muscular substance, as free as possible from all fat and fibre. The muscular

substance so prepared forms a soft pink pulp, and even a good-sized piece of raw meat seems to yield wonderfully little by comparison with the parts that are rejected. It must be a pulp, giving no feeling of resistance when squeezed between the figers.

The modes of administration are many. It may be given by itself, and this way is the best in the case of young children. Very young infants may suck it from the end of their nurse's finger, and most of them take it greedily enough in this way. Children who are older, say from two to five, may swallow it if dusted over with white sugar. Older persons may take it conveniently if diffused through a little strong beef-tea. But there is another way, for which I am indebted to a lady who has made very large use of this remedy in the case of her invalid daughters, and which is known among a pretty wide circle as a *jellied chop*. This consists in diffusing the meat-pulp through a stiff meat-jelly, and allowing it to cool in a shape. This is eaten like a spice, and is very nice to any one whose prejudices are not aroused by the notion of rawness. Salt and other condiments may be added at discretion.

The cases in which raw meat has peculiar efficacy are those in which other food passes undigested, and adds to the irritation of bowels in a state of diarrhœa. It seems to furnish the most efficient kind of nutriment with least inconvenience from bulk or other quality, and to be digested and absorbed with as little fecal residuum as possible. Still, there must be something more about it than this; for the liquid essence of beef will not take its place, neither will cooked meat.

First among the cases in which it is useful may be mentioned any acute cases of infantile diarrhœa, especially the infantile "cholera" of summer. No matter what medicines and what other kind of food may be used, I believe raw meat to be in itself both a remedy for the diarrhœa and a nutriment that may keep the child alive till the diseases passes off.

Secondly, in the chronic diarrhœas of children, arising from scanty food, or, what comes to the same thing, food which cannot be digested, and which consequently passes the bowels as a foreign offending substance, here the raw meat acts as food and medicine.

In the habitual diarrhœa associated with "marasmus"—that is, with the superficial ulceration of the intestinal mucous membrane, and enlarged mesenteric glands of strumous children—the raw meat, especially in the form of the "jellied chop," is of most especial service. It is curious to see in cases of this sort how absolutely the stomach sometimes refuses to act upon the food put into it, so that meat, milk, etc., may be recognized unaltered in the fæces. It is just in these cases that the raw meat shows itself susceptible of quick digestion in the stomach. The cases which the ancients called *lienteria*, or *intestinorum lævitas*, and which were designated in England in the last century "lubricity of the intestines," in which stomach and bowels are so irritable that they pass on and eject the food before it has had time to be dissolved and absorbed, are equally benefited by the use of raw meat.

Lastly, there are the cases of the obstinate vomiting of pregnancy, whether attended with diarrhœa or not. This is a kind of case in which no remedy is unwelcome or superfluous. I cannot take to myself the credit of suggesting it, for the mother of a young pregnant lady who was in imminent danger of exhaustion from vomiting had witnessed the good effects of this food in the case of another daughter who died of ulceration of the intestines, and gave it of her own accord. But I can bear testimony to the fact that the raw meat was taken readily and kept down when almost every other food was loathed and vomited, and I consider the patient's safety largely due to it.

There are other cases of atrophy, dyspepsia, and malnutrition, in which

I have found it useful. I should like also to say a few words on some other uses of meat, cooked as well as raw; but at present I wish mainly to call the attention of my medical brethren to its efficacy in diarrhœa, which may be expected to be the cause of an abundant mortality of infants during the next two months.

4.—*Fatal Arterial Hæmorrhage from the Ear, as a Sequel of Scarlet Fever.* [Lancet, September 24, 1870.]

Dr. P. J. Hynes here reports a very rare accident: A child four years of age passed through a moderately severe attack of scarlet fever, and was treated with but little medication proper. Convalescence was soon established, but on the sixteenth day from the commencement of the fever dropsical symptoms began to manifest themselves. The urine became very scanty and high-colored; not more than a few tablespoonfuls were passed in the twenty-four hours. It was examined and found to contain albumen in moderate quantities. The fractiousness or irritability returned, and the little sufferer became very unmanageable. The next day the urine assumed a dark appearance, containing unmistakable blood-matter. Tolerably large doses of iodide of potassium, accompanied with small ones of digitalis, were successfully administered, and the dropsical effusion gradually subsided. The state of irritability, however, continued; and small doses of hydrate of chloral were administered, under which treatment the patient improved. I may here observe that this condition of irritability, from its being frequently present during the periods of dentition and lactation, is designated among the working-classes "teatiness"—a provincialism which may be a derivative from *teat* or *teeth*, or more probably a corruption of *testiness;* and is far from being an agreeable adjunct to the disease in one's examination of the case, unless the medical man is a stoic, or is endued with an angelic temper. The hydrate of chloral was found to be a valuable calmative remedy, and the progress of the disease so far gave every indication of a favorable termination. The subsidence of the dropsical effusion, the increase in the urinary secretion, and the absence from it of both blood and albumen, the restoration of tranquillity to the nervous system, and the return of appetite, were all indications of a rapid return to health.

On the night of the 26th of July, the twenty-second day from the commencement of the fever, the child was so far recovered as to ask for a crust of dry bread, which he ate eagerly, and without manifesting any pain or difficulty in swallowing. On the following day he enjoyed a very hearty dinner, consisting of beef-steak, bread, tapioca pudding, and some vegetable marrow. On visiting my patient about 3 P. M., I found him sitting up in bed looking very cheerful, and congratulated his family upon his remarkable improvement. I had left his bedroom scarcely more than a few seconds when I was recalled, and was surprised to find the pillow soaked with blood, which I saw issuing in jets from the right meatus, evidently arterial. Cold was instantly applied to the head, and the aperture was plugged with a dossil of lint, which appeared to control the hæmorrhage. I left, giving orders to continue the cold application, and was under the impression that, although there must have occurred a rupture of the membrana tympani, only some little branch of an artery had given way, and that the bleeding, from the bony encasement in which the vessel was enshrouded would be readily checked. A few hours afterward I was hurriedly sent for, having been informed that the child had vomited a large quantity of blood in the interim. My son, who had seen the case, told me that there were at least eight or ten ounces of arterial blood in the basin, and that blood was also mixed with the motions. Ice was ordered, and doses of the tincture of

sesquichloride of iron; but evidently without benefit, for, upon seeing him about 11 A. M. on the following day (the 28th), and removing the dossil of lint from the ear, arterial blood began to flow, but not in jets. The child was blanched, and it was therefore too clear that some large vessel had given way, probably the internal carotid, and that the blood had found a passage through the Eustachian tube into the stomach. In the course of the day a return of the vomiting soon brought the scene to a close.

HYGIENE.

1.—*Improved Hospital Construction.* Mr. HENRY GREENWAY, M. R. C. S., recommends, in the *Medical Times and Gazette*, the following form for the construction of hospital wards:

The portions of the building may be carried out according to taste. The ward consists of a long room, thirty feet wide and fourteen feet high, the walls of which are of masonry, the floor and ceiling of glass and iron. Within this room, and reaching from the floor to the ceiling, is a double row of cells, placed back to back, made of glass with iron framework. Between the fronts of these cells and the main side-walls there is a passage five feet wide, into which the cells open. Each cell, ten feet square, is ventilated by a tube which passes through the wall, then across and underneath the passage, and opens in the floor of the cell through a long iron grating. The outlet of foul air takes place through a tube which leads from the ceiling to the outside of the roof. Around this tube, between the ceiling and the roof is a hot-water appliance (part of a system, extending underneath the roof over all the cells) for heating the air within the tube, and thus causing an upward draught from the floor of the cell. Each cell has its own sash-window on the opposite side of the passage. Outside each window is a small balcony for conducting window-gardening. Inside the front of each cell, on either side of the door, is fixed a transparent landscape. The passages or corridors are heated by a hot-water pipe, and, should the same not suffice for the cells, they would be heated by another. The cells would be illuminated at night by transmitted light from the corridor. At each end of the ward are placed the usual ward offices, and they are separated from the cells by a cross-passage, which unites the two corridors. The nurses' rooms command a view of the corridors; and if a patient, on any emergency, require the nurse's attendance, by pulling a string he would ring a bell, and at the same time cause a signal to project from the front of the cell, thus directing the nurse to the proper quarter. As the ward offices extend not only across the ends of the ward, but project on either side of the building, the ground plan of this portion of the hospital would resemble the letter I.

By this plan the following advantages are gained: Each patient has the enjoyment of his own special supply of atmospheric air (fourteen hundred cubic feet), uncontaminated by exhalations from his neighbor; the cells being made of glass, no absorption of morbid products can take place in the cell-walls, and by occasionally washing them with water, they will forever retain their purity; as the patient lies in his bed, he sees not only the transparent landscapes, but can look through his glass door, and across the passage, at the little garden outside the window. He has also the advantage of an apartment to himself, thus avoiding the unpleasantness often felt of associating with strangers, whose characters might not always bear

investigation. The patient, although plentifully supplied with air, is not exposed to a draught, as the under surface of the bed acts as a screen. Patients not confined to their beds, and having no infection, may be allowed to associate and take their meals in the corridors during the day. I propose calling this a *promenade and cell ward.*

2.—*Impurities of Atmosphere.* [British Medical Journal and Dental Cosmos.]

At a meeting of the Royal Irish Academy, held June 13th, Dr. George Sigerson, F. L. S., read a paper entitled "Further Researches on the Atmosphere." He stated that the results of analyses of *ordinary atmospheres*, such as those of the town, the country, and the sea-breeze, which he had communicated to the Academy on a former occasion, had been fully confirmed by later investigations. The subject of the present paper was the examination of *special atmospheres*, of which the author proceeded to speak in detail. In the air of an *iron-factory* he found a dust of a black color and friable in nature, which was composed of carbon, iron, and ash. The iron was present in small, rough, and jagged pieces, and also in hollow balls averaging one two-thousandth of an inch in diameter. These iron-globules were translucent. In a *shirt-factory* air, filaments of linen and cotton were present in great numbers, and minute eggs were also seen under the microscope, but these were, perhaps, of accidental origin. *Scotch mills*, from the nature and quality of the spongy, spiky dust, which abounded in them, Dr. Sigerson branded as human slaughter-houses. In the dust of printing-offices perceptible traces of antimony were detected by chemical examination. *Stable-air* was shown to contain equine hair, cuticles, epithelium, moth-cells, ovules, various fungi, besides a large amount of other forms of organic matter. The air of a dissecting-room was also largely impregnated with organic particles, and a microscopical examination of the dust collected resolved it into portions of white and yellow fibrous tissue, fibrillæ of voluntary and involuntary muscle, fragments of epithelium and *débris.* In *smokers' air* numerous globules of hot nicotine were observed, of a preëminently hurtful character. Very similar to this was the air inhaled by *tea-tasters*, in which, besides particles of cellular tissue, a narcotic oil of very deadly properties abounded in the form of minute cells. In concluding his paper, Dr. Sigerson took occasion to remark that the carbon which existed in the atmospheres of large cities was of use in counteracting the injurious effects of the presence of albuminoid ammonia, lately described by Dr. Angus Smith, of Manchester, and that, consequently, limits should be placed to the consumption of smoke in factories, etc.

3.—*Does Smoke exert a Prejudicial Influence on the Health of Inhabitants of Large Towns?* By GEORGE OLIVER, M. B. [British Medical Journal, April 9, 1870.]

There is very little if any trustworthy evidence to show that smoke *per se* has any decided local effects on the respiratory organs; but we cannot correctly argue from this that smoke has no influence whatever on the health, for it may act in other ways than by affecting those parts with which it is directly brought into contact. Smoke disseminated through the atmosphere influences the meteorological condition of the latter, chiefly by obstructing in part the transmission of the sun's rays through it, and by attracting humidity and gaseous effluvia and retaining them within its area. The caloric, actinic, and luminous rays are all absorbed by or impeded in their passages through the smoke evolved into the atmosphere of

towns: the actinic rays are more particularly absorbed by smoke. The sensitive plate of the photographer records with extreme accuracy the degree of chemical power of light, transmitted through the atmosphere; and the opinion of photographers is unanimous as to the absorption, to a very considerable degree, of the chemical rays of smoke; and so much is this the case, that several eminent photographers, who have established themselves in large manufacturing towns, have been compelled to remove to suburban localities, in order to preserve their reputation. The chemical rays of sunlight are perhaps more intimately connected with organic life than the heat or luminous rays; and the absorption of them by smoke may greatly retard hæmatosis, and the construction of tissues during the period of development; and may predispose to various forms of disease intimately connected with imperfect nutrition. Light, deficient in chemical force, may also favor the production of anæmia, so prevalent in our large manufacturing towns. The local effects of smoke on the respiratory organs may be trifling or insignificant, when compared with the influence which smoke probably exerts on the public health, by virtue of the power which it possesses of absorbing the chemical rays of light, and of preventing the diffusion of humidity and of effluvia of organic origin.

Though theoretical grounds, on which we might object to the application of the acts providing for the prevention of smoke by complete combustion of fuel, probably do not exist, yet many difficulties of a practical nature stand in the way. It is true that, in merely controlling the emission of smoke from manufactories, by means of legislative enactments, we apply only a partial remedy; still, partial as it is, it is a remedy by which the smoke-nuisance is very considerably reduced in some of our large manufacturing towns. The disinterested opinion of sanitarians on this important subject should be freely communicated to the state.

The discovery of some method of general application by which combustion of fuel might be made less wasteful, and less injurious to the public health, than the present, would confer incalculable benefits on the community at large—benefits bearing almost as much on the economy of public and private resources, and on practical sanitation, as the solution of the problem of utilization of sewage. Attempts made to extend the application of the principle of complete combustion of fuel to private houses will certainly fail, unless some very cheap and simple arrangement, by which smokeless combustion may be efficiently secured, be discovered. The products of combustion might be made to traverse some system of drainage, having outlets away from human habitations; the smoke would in great part be deposited in its course, and it might then be utilized as manure, or in some other remunerative manner.

Miscellaneous and Scientific Notes.

The Journal of Psychological Medicine.—The *London Medical Times and Gazette* (November 19th), writing of this excellent journal, which has now completed the fourth year of its existence, says: "The present (October, 1870) number, in all respects, maintains the high character of its predecessors. The first article, entitled 'Notes on Ecstasy and other Dramatic Disorders of the Nervous System,' and contributed by

Dr. Meredith Clymer, is as replete with thrilling incidents as the most sensational novel of the present day. It is especially devoted to the consideration of the remarkable case of the 'Ecstatic of Bois d'Haine,' which has been recently described by Dr. Lefebvre, Professor of General Pathology in the Catholic University of Louvain; but it incidentally notices various similar cases. The girl expresses great unwillingness to be questioned as to what occurs when in a state of ecstasy, but, in answer to the urgent pressing of her physician, she told him that she found herself suddenly plunged into a vast flood of bright light; soon forms became distinct, and she would witness the several scenes of the passion, as they successively passed before her. She described the cross and the vestments, wounds, and crown of thorns of the Saviour, who, she says, never looks or speaks to her. The ecstasies regularly occurred every Friday at about the same time, the first showing itself on July 17, 1868, and the series going on till the physician's report closes, at the end of 1869. They were preceded by three weeks of stigmatic bleedings, and afterward the two phenomena were coetaneous."

Psychical Phenomena of Epilepsy.—Dr. Meredith Clymer, in a lecture on the mental state of epileptics and its medico-legal relations (*Medical Record*, November 15th), says of the psychical phenomena of marked epilepsy: "Let us now inquire whether there is any pathogenetic correlation between the convulsive phenomena in an ordinary epileptic fit and the psychopathic manifestations of epileptic mania. Many physiologists recognize an intimate connection between the emotions and the sensory ganglia, and particularly the medulla oblongata. Years ago Marshall Hall wrote: 'Emotions, the passions, have their seat in the medulla oblongata, and act along the true spinal and ganglionic nerves.' Later Schrœder van der Kolk expressed the same opinion; and Dr. Lockhart Clarke has, quite recently, said: 'It is probable that the olivary bodies are the centres through which different movements are coördinated for expressing the passions and emotions.' (*Philosophical Transactions*, 1868, p. 319.) Dr. Laycock observes: 'Ideas, feelings, or desires, may, during morbid states, pass downward to the medulla oblongata, and there excite the activity of appropriate motor or kinetic substrata, without at the same time exciting any state of consciousness whatever. This is what oc-

curs in all cases of automatic or unconscious cerebral action.' (*Mind and Body*, ii., 443.) 'The emotional faculties have probably their chief seat in this region [the medulla oblongata], and in the adjacent mesocephale,' says Handfield Jones. (*Studies on Functional Nervous Diseases*, 1870, p. 5.) Now, if we may assume a special relation between the medulla oblongata and the emotions,[1] we can readily understand the relation between the convulsive and psychical forms of the disease. When speaking of the pathogeny of epilepsy, I told you that the medulla oblongata was the starting-point of the convulsive phenomena. It is the immediate centre which excites muscular contraction. Now, whatever is the cause of the irritation of this centre in the beginning of the fit, it is from it that is discharged through the sensory-motory apparatus upon certain muscles the impulsive force—now in the way of irregular muscular movements, and now as automatic muscular action determined by the nature of the emotion, in both cases the higher intellectual centres being in abeyance, and probably in an anæmic state.[2] In the latter instance it is the outlet of the abnormal direction of the emotional excitement .The physical and the mental symptoms proceede from the same cause. There is identity of pathogenetic origin, the difference being expression, and the divers morbid disturbances are the result. We have seen that the maniacal outbreak may precede, follow, or take the place of, the ordinary convulsive fit, thus showing their relationship; and the hypothesis I have offered, based upon physiological grounds, seems to afford a probable explanation of their kinship."

In the same lecture we read the following instructive case, showing the possibility of error and oversight when mental troubles follow nocturnal attacks: "I was lately consulted by a middle-aged gentleman, who told me that for a while he had been at times terribly affected in his mind, and in this wise: Without warning or any immediate provocation he would suddenly have the most horrible homicidal impulses toward certain persons who either really, or at the moment, he imagined, had injured, or slighted, or offended him. In his room, or in the street, or crossing a public square, the fit

[1] This hypothesis relieves the ganglionic cells of the cerebral hemispheres from the double duty of ideation and emotion.

[2] Dr. Carpenter relates, in speaking of Braidism or artificial somnambulism, that on an occasion he saw a blow which was struck alight by chance upon a second hypnotized subject within reach; the latter's combativeness being thereby excited, the two closed, and began to belabor one another with energy, and were with difficulty separated. Their passions were at the moment so strongly excited that even when separated they continued to utter furious denunciations against each other.—*Principles of Human Physiology*, 7th edition, p. 663.

instantly seized him, and, fancying the supposed evil-doer before him, he would strike at him with some fantastic murderous weapon—stabbing him in the neck, or breast, or belly, with a sharp instrument, or giving a blow on the head with a blunt one, the act being accompanied with the most violent reproachful language. He said he was not aware that in the street, or when any one was present, the gestures or speech were more than subjective; but if alone he knew that he spoke aloud, and suited the words to the action. The fit over, he always felt very much exhausted, with more or less loss of muscular power, particularly, recently, of the left extremities. Although occasionally in the company of some of the menaced persons, he had never at such times felt any disposition to harm them, or to behave toward them in any way that showed the feelings he at periods involuntarily experienced regarding them; but he was tormented by the apprehension that the time might come when he would be attacked while in their presence, and thus commit some horrid crime. He was a man of high moral tone and Christian training and practice, irritable, subject to temper-fits from childhood, but naturally of an amiable and generous disposition. He was greatly distressed at his infirmity, had for some time concealed it, and at last, dreading the possible consequences, sought advice. He said he had more than once decided to go voluntarily to an asylum, but was withheld from the fear of exposure and injury to his prospects and family. I found out in the course of my examination that he had also at times suicidal thoughts, or, rather, that more than once the idea of the effects of the several methods of self-murder had been, as he said, irresistibly obtruded on his mind, and particularly the sensation of a discharge of a pistol in his mouth; but, as he observed, he had never seriously meditated at any time suicide; it was rather, as called it, an æsthetical contemplation of the means of self-destruction, without any especial desire to practically test them on himself. Although he had had many vexations from pecuniary losses and general bad luck, he was usually cheerful, not cast down by, nor given to brooding over, his troubles; and performed the daily duties of his calling, which did not demand any very great mental strain, easily and creditably. He had no headache, and his general health was excellent. After one of these spells his left arm would feel weary and his left leg weighted, along with some numbness and tingling in the parts; these sensations would soon pass off. He had had neuralgic attacks occasionally for many years, but they had become lighter and rarer. He never had suffered from epileptic fits, or, as he thought, any thing like them; nor had any of his family. One day he asked me to prescribe some-

thing for a sore tongue, and on examination I found evidence of its having been bitten, which led me to believe that he was subject to nocturnal attacks, and on being questioned he admitted that often before falling asleep he had remarked that his jaw snapped, and sometimes his limbs jerked. I looked upon these phenomena, apparently so insignificant, as really the key to the psychical troubles, and the effects of treatment have tended to confirm the opinion."

Dr. Liebreich, the eminent ophthalmologist of Paris, is at present residing in London, and has given lectures on his specialty at St. Mary's and other hospitals, and is everywhere warmly received. A new edition of his "Atlas of Ophthalmoscopy, representing the Normal and Pathological Conditions of the Fundus Oculi as seen with the Ophthalmoscope," with an excellent translation of the text into English by Mr. H. Rosborough Swanzy, of Dublin, has just issued from the publishing-house of the Messrs. Churchill. Some of the less important plates of the first edition have been omitted, and are replaced by chromo-lithographs of choroiditis disseminata, recent retinitis hæmorrhagica, optic neuritis, partial atrophy of the optic disk secondary to retro-ocular affection of the nerve, and atrophy of the papilla secondary to retinitis. The reality of the representations makes them of great value to the student of ophthalmology. It is to be hoped that this truly great work will receive in this country the patronage it so well merits. Its price has been reduced one-half.

Transmission of Disease by Vaccination.—The prolonged debate of the Imperial Academy of Medicine of Paris on this important subject has the result, it would appear, of almost completely disproving the allegation that disease is frequently propagated by vaccination. The *Union Médicale*, in its issue of the 9th Sept., says that M. Depaul, the exponent of this theory, "finds himself at this moment completely isolated in his doctrines." If our readers have followed these debates with the attention which they merit, they will have learned—

1. That the degeneration of Jennerian vaccine matter is any thing but proved.
2. That not a single authentic example of vaccinal syphilis, properly so called, has been shown to exist.
3. That the very rare cases of syphilis inoculated by vaccination are explained by conditions which exonerate completely the vaccine of any impurity.

4. That a great number of cases of supposed syphilis supervening on vaccination leave the most reasonable doubt as to their genuineness.

5. That other modes of vaccination may be encouraged, although they present no real and sensible advantage over vaccination from arm to arm.—*Medical Press and Circular.*

Therapeutical Action of Cold Affusions in Typhoid Fever.—M. de Lambert, who has lately written at length on this subject, has arrived at the following conclusions:

1. Cold affusions are especially advantageous in typhoid and the eruptive fevers.

2. They act on the principal and most constant phenomenon in these diseases, namely, the elevation of the temperature, by diminishing it. They are, consequently, in the highest degree, antipyretic. They bring down the temperature from 0.5° to 3.0° (centigrade).

3. They favor the restoration of a full, deep, and regular respiration.

4. They stimulate the peripheral circulation by strong and rhythmical contractions of the capillary vessels, contractions caused by reflex action.

5. They stimulate all the physiological secretions.

6. They restore to the skin its suppleness, its moisture, and its healthy color.

7. They, in general, favor the appearance of the eruption, and recall it when it has disappeared.

8. They calm cerebral agitation in awaking activity of the cerebral circulation; they suppress delirium, coma, and lessen prostration.

9. They cause a general feeling of comfort, which allows the patient to sleep quietly.

10. They diminish the frequency of the pulse by 8 to 20 or 30 beats.

11. They relieve headache.

12. Their antipyretic action lasts for two to six or eight hours.

13. They should, as a rule, be repeated from two to fou times in twenty-four hours.

14. They are specially indicated in the severe cases of typhoid fever, or of one of the malignant eruptive fevers.

15. They do not influence the duration of these diseases, but render them lighter, or lessen their severity.

16. They are not indicated in all cases of these diseases without exception; they do not, therefore, constitute a general method of treatment, to the exclusion of all other concomitant therapeutical means.

17. They may be advantageously associated with application of cold bandages, or with the employment of cold lotion.

18. Their application is easy, and is not attended by untoward results to the patient.

19. Their methodical and rational employment is based on the principles of clinical physiology.—*Med. Press & Circular.*

Lead-poisoning from Snuff-taking.—A case has recently occurred in India presenting all the symptoms of lead-poisoning, in which, after protracted search, the lead was traced to the snuff which the patient was in the habit of using freely. The variety of snuff used was exported from England in leaden cases, and the sides of these cases were found on inspection dotted with little spots of carbonate of lead, formed, it was supposed, by carbonic acid, liberated by fermentation of the damp snuff. This is, in fact, a minature copy of the process by which the white lead of commerce is manufactured.

Paris Diet.—A Paris correspondent of the London *Times* speaks in high praise of a *salmi* of rats on which he breakfasted at a restaurant. It was composed of two rats, with toast and gravy, and cost one franc fifty centimes. The flesh is described as white, very delicate, something like young rabbit, but with more flavor.

Chloral Hydrate in Tetanus.—In our November number we collated a number of cases in which chloral had been employed with varying results. Other cases are occasionally reported, and, through the courtesy of Dr. Charles W. Badeau, of this city, recently an interne at Bellevue Hospital, we are enabled to put on record the two following cases which have not previously been made public :

Case I.—James Kelly, aged nine years, New York. Admitted to Bellevue Hospital June 9, 1870. His general history is good. Nine days ago he hurt his heel on some sharp substance, causing slight hæmorrhage. He remained as well as usual until last night, when, after going to bed, he became quite restless, and complained of a "tightness" in the lower jaw, and a pain in his back. The next morning (9th) he could not walk, the right foot being drawn up ; teeth tightly clinched, and about every hour he would have an attack, during which he became rigid, and would bend his head back.

On admission he is found to have a small ecchymotic spot on the sole of the right foot at the outer border of the os calcis. The right foot is strongly extended, and can only be flexed with great force; the masseter muscles are hard and rigid, and the teeth can only be separated about one-quarter of an inch. He is ordered chloral hydrate in twenty-grain doses, to be repeated often enough to keep him thoroughly under its influence.

June 10th.—Patient has been kept in a somnolent condition with the chloral; has taken about a hundred and twenty grains in twelve hours; has had no severe convulsion, and but one or two slight ones.

P. M.—Condition about the same. The chloral is given whenever he becomes conscious enough to swallow it. No more severe convulsions.

June 11th.—At 1 A. M. he had a severe convulsion, and at 1 P. M. died in another, with opisthotonos.

Autopsy revealed only slight congestion of the membranes of the brain and spinal cord.

CASE II.—Martin Seth, aged twenty-eight, Germany. Admitted to Bellevue Hospital July 14, 1870. This man was run over by a truck the day before his admission, and received a compound fracture of the right tibia, and a small lacerated wound over inner aspect of head of left tibia. The communicating wound was on the inner side of the leg, and leads obliquely into the fracture. The leg was swung in a fracture-box, and an ice-bag applied to the wound.

July 29th.—General condition good; wound healing slowly.

August 1st.—The bones being a good deal out of place, and the wound discharging, the leg is removed to a new fracture-box filled with bran, and Buck's extension-apparatus applied to the foot.

August 2d.—The patient complains of some stiffness about the jaws and dysphagia; throat a little sore.

August 3d.—Difficulty of swallowing increased, and he cannot fully open his mouth; slight spasms occasionally in the sound leg; left sterno-mastoid rigid; muscles of back somewhat contracted; has spasms in both legs and lower jaw. 7.30 P. M.—He took twenty grains of chloral. 9.30 P. M.—Has slept some; says the medicine has stopped the spasms in his legs; trismus unchanged; can only open his mouth about one-half inch; pulse 112; respiration 16; twenty grains of chloral given. 11.30 P. M.—Pulse 84; respiration 12; no more spasms; muscles of neck less rigid; says that he swallows better; trismus unchanged; ten grains of chloral given.

August 4th.—1.30 A. M.—Sleeping quietly, and not disturbed. 4.30 A. M.—Still asleep. 6.30 A. M.—Pulse 96; respiration 16; had one slight spasm of left leg this morning; tris-

mus the same; left sterno-mastoid very rigid; other muscles lax; chloral, twenty grains. 10 A. M.—Pulse 88; respiration 16; condition, same; took twenty grains of chloral. 12 M.—Pulse 112; respiration 18; condition, same; chloral, twenty grains. 2 P. M.—Pulse 96; respiration 16; has been sleeping; chloral, twenty grains. 5 P. M.—Pulse 88; respiration 12; condition, same. 9 P. M.—Pulse 102; sleeping soundly; not disturbed. 12 M.—Pulse 84; respiration 16; muscles of jaw much less rigid; no other muscles now affected; dysphagia same as when last mentioned; appetite good; chloral, twenty grains.

August 5th.—2.30 A. M.—Sleeping quietly; not disturbed. 5 A. M.—Pulse 100; respiration 16; no change since last notes; chloral, twenty grains. 10 A. M.—Pulse 98; respiration 14; same condition; chloral, twenty grains. 12 M.—Pulse 94, soft; respiration 14; trismus same as yesterday; same difficulty in swallowing; has had no more spasms; chloral, twenty grains. 2.30 P. M.—Trismus less; pulse 94; respiration 12; chloral, twenty grains. 6 P. M.—Pulse 88 and soft; respiration 14; no change; chloral, twenty grains. 9 P. M.—Pulse 74; respiration 18; says he cannot keep awake; dysphagia much less; trismus the same; chloral, thirty grains. 11.30 P. M.—Sleeping, and not disturbed.

August 6th.—1 A. M.—Has been sleeping profoundly all night; pulse 94; respiration 18; chloral, thirty grains. 10 A. M.—Pulse 88; respiration 14; condition same; chloral, twenty grains. 1 P. M.—Pulse 84; respiration 18; condition, same; chloral, thirty grains. 4 P. M.—Pulse 94; respiration 16; condition unchanged; chloral, thirty grains. 7 P. M.—Pulse 86; respiration 16; same; chloral, thirty grains. 11 P. M.—Pulse 88; sleeping soundly, and not disturbed.

August 7th.—2 A. M.—Still sleeping; condition unchanged. 10 A. M.—Given forty-five grains of chloral; no change. 4 P. M.—Given forty-five grains of chloral; no change. 11 P. M.—Pulse 76; fast asleep.

August 8th.—10 A. M.—Pulse 84; chloral forty-five grains. 1 P. M.—Pulse 84; respiration 16; chloral, sixty grains. 6 P. M.—Pulse 70; respiration 20; pupils dilated; acts like a drunken man; trismus unchanged. 11 P. M.—Sleeping soundly.

August 9th.—9 A. M.—Trismus better; temperature 95 degrees; pulse 84; respiration 20; chloral, sixty grains. 6 P. M.—Pulse 76; respiration 20; pupils dilated; trismus same as at last note; wound doing well; chloral, sixty grains.

August 10th.—10 A. M.—Pulse 80, and small; respiration 16; chloral, sixty grains. 6 P. M.—Pulse 76; respiration 16; trismus improving; chloral, sixty grains.

August 11*th*—10 A. M.—Chloral, ninety grains. 6 P. M.—Chloral, ninety grains.

August 17*th*.—Up to date has been taking ninety grains of chloral night and morning, which suffices to keep him under its influence all the time. Trismus is barely perceptible; mouth can be opened almost to its full extent; wound over fracture doing well; pulse and temperature normal; respiration varies from 12 to 16.

August 18*th*.—Chloral stopped for experimental purposes.

August 19*th*.—Says he did not sleep any last night, neck is stiff, and he can hardly swallow, muscles of back are rigid, and he has spasms of the legs and back.

August 20*th*.—Symptoms continuing to grow worse, chloral is resumed in the same doses as last mentioned.

August 21*st*.—Condition the same as before stopping chloral; nothing but slight trismus. Chloral, ninety grains twice a day.

From above date the chloral was given in gradually-diminished doses, and at the end of the week was stopped altogether. Patient from that time had no more tetanic symptoms. This case is remarkable for the enormous amount of the chloral which was administered, not alone with apparent impunity, but with a decided advantage in securing comfort to the patient and compelling sleep. From August 3d to August 21st, at which time the doses began to be lessened, no less than five ounces and a hundred and five grains of chloral were given. No record, unfortunately, is made of the amount administered since the last date.

Mr. J. Waring Curran records a case in the *Medical Press and Circular* of October 12, 1870:

On the 17th September, I was requested to visit a man, who, it was stated, was suffering from quinsy. When I got to the house, I found my patient, a man of three-and-thirty years of age, lockjawed. From himself I could learn little; the paroxysms of tetanus were frequent and severe; the head was drawn back and the chest directed forward, so that to relieve him the occiput had to be pressed forward and the chest backward. Upon examining the spinal region, I discovered the seat of mischief, which existed at the lower dorsal region. It appeared that, when at work in a colliery-pit, he sustained a punctured wound of the spine; no attention was paid to it, since little pain was suffered from it, until the commencement of the tetanic symptoms.

The wound was probed and dressed, and belladonna extract rubbed around the wound and along the spinal column; the bowels were well cleared out, and I gave him full doses of bromide of potassium, tincture of belladonna, and camphor-julep, in mixture. Under this treatment the paroxysms became subdued in character and diminished in number. As he did not sleep at night, I exhibited two drachms of Ferris's syrup of chloral, which is equivalent to twenty grains by weight of the drug. The man was in a "field-club," and, to his friends, appeared improving, so that when they went to give notice of his illness they were informed they must have a certificate from the field-doctor. This gentleman, a person named Stanford, came, took charge of my unfinished case, and held it two days, until the symptoms returned so alarmingly that I was again requested to renew my treatment. The paroxysms were now frequent, and the sufferings of the unfortunate man truly great. I gave him two-drachm doses of the syrup of hydrate of chloral every two hours, increasing it to four drachms, but without the slightest effect, one way or the other. A strong belladonna enema appeared to arrest the paroxysms for a time, but they only returned with renewed and aggravated severity. *I now exhibited the chloral every hour, narrowly watching its action, but it produced no more therapeutic effect than so much simple syrup might be expected to produce.*

The unfortunate man died on the seventh day. A *post-mortem* examination was denied me.

At a recent meeting of the Clinical Society of London, Mr. Ogle read the history of a case:

The patient, a healthy boy, got a bruise on the thumb. Three days afterward he complained of stiff neck, and vomited, and shortly afterward became affected by opisthotonos. On the fifth day after the injury he was admitted into St. George's Hospital in a state of tetanus. He was put fully under the influence of belladonna; ice was constantly kept applied to the spine, and chloral was given at night to induce sleep. It was noticed that at no time did the sardonic smile exist, and never was there any trismus or (except on one day) difficulty in swallowing liquid food, such as wine, brandy, beef-tea, and beaten-up eggs. In this case the temperature and pulse were registered twice a day; and it was noticeable that almost throughout the patient's stay in the hospital the temperature was higher in the evening than in the morning, on one day reaching 102.3 degrees. About the fourteenth day after the injury the tetanic symptoms began to abate, and by degrees

the belladonna and the chloral were discontinued, and also the application of ice to the spine. After about a month from the accident the patient left the hospital quite well, and has so continued ever since. Dr. Ogle suggested that possibly the examination of numbers of cases of tetanus might show that the temperature always increased in the evening, and that this fact might have value in diagnosticating true tetanus from certain cases of affections of the spinal cord and its membranes, certain cases of hysteria, and strychnia and other poisoning. Dr. Ogle believed that the highest temperature arrived at in tetanus was recorded by Wunderlich, who described it as being 108 degrees shortly before death, 112.55 degrees at death, and 113.56 after death. He also alluded to a case of tetanus in which, after the attack, the patient was subject to great irregularity of the heart's action, with much discomfort and palpitation on exertion, as if the mechanism of the organ had been injured in some violent muscular effort.

In the discussion upon this case Mr. Croft said that he had recently treated a similar case, which had recovered. He used nothing but the hydrate of chloral, and the effect of it was very decided. When intermitted for twelve hours, the patient became much worse. Treatment was continued twenty-one days.

Mr. Paget, the president of the Society, had seen a case in which chloral was administered in large doses. It comforted the patient, but did the disease no good, for "he died just the same." Dr. Broadbent had also treated a case, non-traumatic in its origin, with the same remedy. This case also proved fatal.

In the *Gazette des Hôpitaux*, No. 68, 1870, MM. Dubreil, Lavaux, and Onimus, report the case of a man who, seventeen days before, had been wounded in the thumb and forefinger by a circular saw. For the first ten days, the patient, who was under the care of a druggist, did not suffer much; but, after some irritating substance had been applied to the wound, he was attacked by trismus and pain along the spine. He then consulted Dr. Lavaux, who ordered a poultice, with bromide of potassium and belladonna internally. His pulse was 120, and he was bathed in perspiration. The muscles of the jaws, neck, thorax, and abdomen, were in a state of contraction. Respiration was diaphragmatic. The patient was ordered 90 grains of chloral daily; and, also, Dr. Onimus was asked to apply the continued current, which he did by means

of a pile of protosulphate of mercury. Under the chloral the pulse came down, and the muscular tension diminished. The patient remained in a half-asleep condition. The continuous current, while applied, produced a complete relaxation, but the contraction afterward returned; the ribs moved normally during the use of the current, though they were quite fixed during the spasm. The improvement of the first days did not increase, so on the sixth day of its use the current was stopped, and on the ninth the chloral also. On this day, however, Dr. Lavaux at his visit found the patient in a tetanic spasm, with a complete arrest of respiration and circulation, while the body was covered with cold sweat. He instantly applied the current as strongly as possible to the vertebral column, and under its influence the heart began to beat, stertorous respiration commenced, and the muscles relaxed. Dr. Lavaux states that, for at least a minute, there was neither respiration nor movement of the heart. The electricity was used for two hours, and the dose of chloral increased to 120 grains daily. Improvement recommenced and went on for six days, when, by an accident, the patient did not get his chloral. Next day symptoms returned with great severity, attacking the muscles of the limbs. The pulse went up to 110. He then got 240 grains of chloral in twenty-four hours, and the electricity was continued. In two days the spasm diminished, and this time the cure was complete. On the fortieth day of treatment the patient was able to go on foot to show himself to Prof. Verneuil at Lariboisière.

So far as we are warranted in generalizing from the cases already on record, Mr. Paget's remark, quoted above, seems to cover the whole ground. The chloral has no absolute curative effect in tetanus, but it is of service by quieting the spasms and relieving pain, and thus, by preventing the wear and tear of both muscular and nervous systems, undoubtedly contributes to the recovery.

In the *Leavenworth Medical Herald*, of December, 1870, Dr. Benjamin Woodward describes a very rare congenital malposition of the stomach. The child died when two and a half months old, and had not been well at any time during life. The stomach was located entirely above the diaphragm—the duodenum passing through the œsophageal foramen. There were no adhesions to either diaphragm or pleura.

Dr. John Rolph, one of the most distinguished medical men of Canada, died at his home on the 19th of October. He

was the founder of the two medical schools now existing in Toronto, Canada, viz., the Toronto School of Medicine, which was afterward consolidated with the Victoria College, and the Medical Department of McGill College.

Dr. Pollock, of Lycoming County, Pa., reports (Transactions State Medical Society of Pennsylvania, 1869) the case of a lady from a remote county of the State who consulted him respecting a most offensive, long-continued vaginal discharge, which debarred her from society, and rendered her disagreeable to herself and disgusting to her friends.

On examination, he discovered, deeply embedded in the folds of the vagina, a foreign substance, which, with some difficulty, he successfully removed. It proved to be an old gum-elastic pessary which two years previously had been introduced by her physician, and had been forgotten by both during that long period. Its removal restored her to the society of her friends, and she returned to her home much elated at her recovery, and her escape from her loathsome condition.

Influence of Cold Drinks on Blood-pressure.—Hermann and Ganz (*Pflüger's Archives*, 1870, p. 8) have endeavored to ascertain what may be the reason for the widely-spread belief that cold drinks are dangerous during a heated state of the body. They injected water at a temperature of 0° C. into the stomachs of dogs. The blood-pressure always rose after an injection. This result cannot in their opinion be ascribed to absorption, because it appeared very speedily after the injection, and moreover hot water failed to produce it. The tracing obtained by the kymograph further showed that the increased pressure was not due to increased cardiac action; they therefore ascribed it to contraction of the vessels due to the cold. They suppose that the evils which are commonly ascribed to drinking cold water during a heated state of the body are due to the sudden increase of blood-pressure which the cold produces, favoring congestion of the brain and lungs. Quite in opposition to what one would have anticipated, they found the increase of pressure much less in animals previously paralyzed by curare. They fancy that when an animal is not so paralyzed, the cold, by increasing the frequency of the respirations and the depth of the inspirations, brings into play a compensating mechanism which keeps the pressure from rising so much as it otherwise would (?). It is satisfactory to know that

they intend to investigate the whole question further.—*Journal of Anatomy and Physiology.*

Bismuth in Cholera Infantum.—Dr. W. Walling claims, in the *American Practitioner*, a very remarkable success from the use of subnitrate of bismuth in the treatment of cholera infantum. He says: "In the first case in which I prescribed the bismuth, vomiting was intractable, and it was this symptom which led me to make a trial of the remedy. The effect was prompt. Not only was the retching arrested, but with it all other symptoms were relieved. Since then I have used the bismuth to the exclusion of all other internal remedies, except occasionally, in malarial cases, the sulphate of quinine. I prescribe it in doses of ten grains to a scruple, repeated every second hour, until relief is experienced. I direct it to be given in the mother's milk, recently drawn; or, if the child is not at the breast, in any article of food it may be taking.

"The shortest period in which I have arrested the disease with this remedy is seven hours, or after the administration of four doses. The longest time that I have had a patient under treatment with it was three days. The average duration of the thirty-three cases was fifteen hours.

"I have enjoined, in all cases, abstinence from all articles of diet but milk, and have directed this to be given in small quantities and at regular intervals.

"Of the thirty-three cases which have fallen under my care this season, not one has had an unfavorable termination. In some the symptoms were violent. In a number the hygienic circumstances surrounding the little patients were exceedingly unfavorable."

Quinine in Pregnancy.—We insert the following from Dr. Rooker, of Castleton, Indiana, merely premising that we are not quite so sure in reference to God's ordinance as the writer expresses himself in the last sentence of his communication: "Residing in the vicinity of White River and Fall Creek, I have had an excellent opportunity of studying malarial diseases. Commencing practice thirteen years ago, by my education prejudiced against the use of quinine in pregnancy, it was not until I saw a few of my patients die of congestive chills and other forms of malarial disease, and not *unusually* in others premature labor occur, I resolved to change my practice. For some time I have been giving quinine freely, where indicated, in all stages of pregnancy, and never with bad results. In brief, I think God has ordained that *no* remedy will act directly on the gravid uterus."—*American Practitioner.*

Skin transplantation, for the healing of indolent and chronic ulcers, has been recently tried on a more or less extensive scale at almost all the great hospitals of London. The success has been variable, but the weight of testimony appears to confirm the asserted value of this procedure. Mr. Pollock, who was the first to introduce the operation into England, has been especially successful in his experiences at St. George's Hospital.

The Alice Hospital at Darmstadt.—We learn, from the London *Medical Times and Gazette* (November 26th), that in September last the Hessian Government gave to Dr. Charles Mayo, of London—well remembered, in this country, by the zeal and ability with which he discharged the duties of surgeon of volunteers during a part of our civil war—a commission to establish a military hospital at Darmstadt, and act as director of it. The war-office gave the use of certain stone buildings, which were converted into kitchens, linen-store, and sleeping-rooms for the medical officers and nurses, laundries, etc. The wards, four in number, are long wooden buildings, on the American plan, placed in *échélon*, and each having twenty-eight beds. On the south side, not only the windows, but the spaces between them, are made to open. The hospital has no drains; all impurities are carried into tubs containing sulphate of iron, which are regularly emptied into pits dug at a distance from the wards. Permanganate of potash and chlorinated soda, in solution, are freely used; carbolic acid in a less amount. In pursuance of instructions from Berlin, the capacity of the hospital is to be increased by one hundred and twenty beds, the government paying the expenses. The chief expense so far has been paid by the "National Society for the Sick and Wounded" (London), by private contributions from Winchester and Manchester, and by an eminent mercantile family in London.

On November 10th, Dr. Mayo had the honor of dining with the Queen of Prussia, at the palace at Hombourg, who expressed to him that the kindly feeling which had induced the founding of the hospital was fully appreciated in Germany. It is named after a daughter of Queen Victoria, married to Prince Louis of Hesse.

The announcement, in our last number, of the retirement of Prof. John T. Metcalfe from the chair of Clinical Medicine at the College of Physicians and Surgeons, proves to be incorrect. The information came to us from what we supposed an authentic source, and we hasten to correct any wrong impression which our notice may have created. At the same time, we venture to express our satisfaction that the college is not to lose the services of this distinguished clinical teacher.

In one of our foreign exchanges we find an advertisement published for the purpose of securing the services of a hospital interne. The advertisement closes with this slightly-dubious phraseology: "The interne is lodged, fed, warmed, lighted, and washed, and receives besides a salary of 800 francs per annum."

The Position of Medical Officers in the Navy.—At a meeting of the Alameda County Medical Association, held at its rooms in Oakland, California, October 17, 1870, the following was unanimously adopted:

Whereas, Of late repeated and persistent insults have been offered our professional brethren in the U. S. Navy, by the authority of the Navy Department, degrading them in rank and position; lessening by example the respect due their profession, and contracting their sphere of usefulness; and,

Whereas, In every civilized community throughout the world, save in our Navy, the profession of medicine is considered at least equal in dignity and respectability to any other profession; and,

Whereas, In our service the members of the medical staff are selected by competitive examination from among the graduates of our medical schools, while the line officers are selected to be educated at the country's expense from among the uneducated boys of the community, by favoritism, by relationship, or, as has lately been proven, by purchase; and,

Whereas, Rank and command are distinct ideas, having no necessary connection; there being a recognized necessity for *one* commander in all military operations, to whom the other officers are subordinate for the time being; and,

Whereas, If physical courage and personal exposure are the only tests of merit, no corps can show, during the late war, for example, a larger proportion of killed by the enemy, by fire, by water, or by the more deadly and insidious foe—disease, than the medical officers of the Navy: therefore be it

Resolved, That we consider the stigma to which they have

been subjected as applying to the profession at large, and while it is unremoved we consider that no young medical man having a proper regard to his self-respect can accept an appointment in the medical corps of the Navy and subject himself and his profession to the indignities which the self-constituted and newly-born "aristocracy of the line" impose.

Resolved, That we view with pain and sympathy the position of the senior officers of the medical corps, whose long service now renders it impossible for them to resign and commence life anew; and we call upon our Senators and Representatives in Congress to recognize their position as coequal with the highest in the service, by giving them military rank, such as is justly enjoyed by the medical staff of the Army, and by that in the services of each of the civilized nations of the world, together with such increased emoluments and promotions as will recognize their invaluable services to our country, and recompense them for the insults and oppression to which they have most unjustly been subjected.

Resolved, That a copy of these resolutions be sent to each Senator and Representative from this State, and that our delegates to the State Medical Society be instructed to bring this subject before that body for its action.

(Signed) T. H. Pinkerton, M. D., *President*.
S. C. Holmes, M. D., *Secretary*.

A Case of Alleged Malpractice.—The plaintiff in this case brought an action against the defendant, Dr. John J. Reese, of Philadelphia, Professor of Medical Jurisprudence and Toxicology in the University of Pennsylvania, for alleged malpractice as a surgeon. The case came to trial on the 17th and 18th of October, 1870. From the evidence on the trial, it appeared that on the 2d of February, 1869, the plaintiff Haire, by trade a house-painter, while engaged on the outside of a house, fell, by the giving way of a jack on which he was standing, to the ground, a distance of twenty-eight feet, his body striking against a fence in the fall. The defendant was sent for, and came immediately, took up the arteries in the head which had been cut, and then proceeded to examine the hip, in which the man complained of much suffering. The plaintiff was removed to his home, and, at his request, Dr. Reese took charge of the case. A careful examination of the hip, under etherization, showed neither fracture nor dislocation. After administering an anodyne, and directing an anodyne application over the joint, he left him. On the next day another critical exam-

ination was made, but no evidence of fracture or dislocation appeared. Three weeks after the accident, Dr. Reese, having in the mean time visited him daily, suggested a consultation with Dr. Agnew, Professor of Clinical Surgery in the University, who also made a most thorough examination, subjecting the limb to all the usual tests. He too failed to detect either dislocation or fracture. Dr. Reese continued in attendance until the 10th of May. For the professional services he had rendered he had at the time of the trial received no compensation. On the 6th of August following, Haire called on Dr. Agnew, at his office, who then noticed that there was some shortening of the limb. When asked when the shortening had happened, he replied that "it was after he had got about on crutches." He was advised to throw away his crutches and get a high-heeled shoe. He paid Dr. Agnew for his services by bringing a suit against him. Afterward he went to the Jefferson Medical College Clinic, and Prof. Gross prescribed an ointment for his leg, and he subsequently accused him of having poisoned him. He then went to see Dr. Duffie, who gave him the same advice that Dr. Agnew had last given. It appeared in evidence that, while Dr. Reese was in attendance on Haire, the latter had consulted others without informing his surgeon, and had applied to his leg various nostrums which these persons had recommended. He then brought suit against Dr. Reese, charging the shortening of the limb to his ignorance and negligence, and seeking to make him responsible for it.

The witnesses called to sustain the plaintiff's assertion were, first, a Dr. John, who stated that he was a graduate of the College of Surgeons, Edinburgh, who does not appear by the evidence to have employed the exact methods of examination usually resorted to in such cases. He looked at it about two years after the accident, and gave, as he styled it, "a casual opinion," founded upon a comparison by the eye of one leg with the other, and upon what he had heard of the history of the case—he did not even measure the two limbs—that the neck of the thigh-bone had been fractured. The next witness was Moses Stevens, who said he had graduated in medicine in 1870, after studying two years. He had examined the plaintiff's limb last winter, and believed it to have

been fractured at the time of the accident. On his cross-examination, among other things, he stated that "the head of the femur might be 'crepitated' by absorption." The last witness, Dr. Jos. D. Scoles, said that he had formed an opinion that the hip-bone had received an injury which occasioned the shortening of the limb, and that this shortening might have been caused either by fracture or absorption, and it was impossible for him to say which. This was the substance of the evidence on which the plaintiff based his charge.

On the part of the defendant, the surgical witnesses were Drs. D. H. Agnew, S. D. Gross, Duffie, John H. Brinton, and R. J. Levis. Their testimony was unequivocal and to the same effect, namely, that Dr. Reese's treatment was proper and skilful. Dr. Agnew stated that, three weeks after the injury, he had used every test known to surgical practice to ascertain whether there had been a fracture, and was clearly of opinion that there had been neither fracture nor dislocation; and that, if there was fracture at the time, it could not be discovered by any human means. Dr. Gross testified that, after his examination of the plaintiff's limb, he came to the conclusion that the shortening was the result of severe contusion. Dr. Duffie was of opinion that it was a case of absorption of the neck of the femur consequent on contusion. Dr. Hirst, in his cross-examination, admitted that concussion might bring on disease of the articulating head of the thigh-bone, resulting in interstitial absorption, which would occasion shortening of the limb. Judge Thayer, in his charge, remarked: "I have a right to say, and I conceive it to be my duty in this case to say, I see no satisfactory evidence that the treatment of Dr. Reese was not, in all respects, skilful, wise, humane, and proper." He, moreover, laid down the following points of law for the guidance of the jury:

1. The implied contract of a surgeon or a physician who attends a patient is, not that he will certainly effect a cure, but that he will use all known and reasonable means to accomplish that object, and that he will attend his patient carefully and diligently. His relation to his patient implies that he possesses, and will employ in the treatment of the case, such reasonable skill and diligence as are ordinarily exercised in his profession by thoroughly-educated surgeons or physicians; and, in judging of the degree of skill which he contracts to bring to the service of his patient, regard is to be had to the advanced state of the profession at the time.

2. No presumption of the absence of proper skill and attention arises

from the mere fact that the patient does not recover, or that a complete cure was not effected.

3. On the part of the patient, it is his duty to conform to the necessary prescriptions and treatment, if they be such as a surgeon or physician of ordinary skill and care would adopt or sanction; and, if he will not, or, under the pressure of pain, cannot, the surgeon or physician is not responsible for injury resulting therefrom.

4. When malpractice, or want of skill or proper attention, is charged against a physician or surgeon, the burden of proving it lies upon the person who alleges it.

The jury, without leaving the box, returned a verdict for the defendant, the costs to be paid by the plaintiff.

This case has a double interest; both its surgical and legal bearings are important. Dr. Reese admitted that some shortening did exist at the time of trial, but not at the time he ceased attendance upon him, more than seventeen months before. He denied, too, that this shortening was the result of a fracture of the thigh-bone at the time of the accident, but held that it was caused by interstitial absorption of the neck of the thigh-bone, caused by the violent contusion of the trochanter, inasmuch as it did not show itself until some months after the injury. In this view he was sustained by high surgical authorities, who appeared as witnesses for the defence; and he, moreover, presented many morbid specimens illustrating this theory of the deformity. He referred also to some very striking cases of a similar injury (contusion), by Mr. Gulliver (Edinburgh *Medical Journal*, xlvi., 1836), and to a very recent lecture of Mr. James Paget's (*British Medical Journal*, February 19, 1870), both of which throw much light on this often obscure point in surgery—*the cause of shortening of the leg as the result of direct injury to the hip.* None of the medical witnesses on the side of the prosecution would, on the stand, positively give a rebutting opinion.

Dr. Reese, in a clear and modest statement of the case, published in the *Medical Times*, December 1, 1870, says, with regard to the action for malpractice: "I heard nothing more of this man [i. e., from the time he ceased attendance upon him, May 10, 1869] until the month of August following, when I received a note from an attorney, apprizing me that my quondam patient had commenced a suit against me for damages for causing him to have a shortened limb." This legal gentleman being satisfied, after an interview with the

doctor, that there were no grounds for an action, gave up the case. A second lawyer was employed, and he likewise abandoned it. A suit was then begun against Prof. Agnew, who had seen the patient once in consultation. A third attorney was employed, and the cases were pushed for trial. Dr. Agnew's was first called up and postponed, until after the trial of Dr. Reese's.

At the end of his statement—"I regarded it as a matter of principle, and as a duty I owed to the profession, fearlessly to meet this lawsuit, which might easily have been avoided by listening to the proposals of the plaintiff's counsel to pay blackmail; I felt that the honor of our common profession was on trial"—Judge Thayer concludes his excellent charge to the jury, in which he thoroughly and understandingly went over the whole ground, with these words: "But if, on the contrary, you come to the conclusion that the plaintiff's complaint is altogether unfounded, then it concerns not only the interests of the parties in the present case, and not only the interests of public justice, but also the established medical fame of this city [Philadelphia], that you put an end, so far as you can, to experiments, by unjustifiable lawsuits, against skilful, attentive, and humane physicians."

Fortunately, in the present case, the experiment was attempted against a gentleman whose character, private and public, during over thirty years of professional life, has been one of eminent singleness and purity, and who has worthily won the high honors he so modestly wears.

The Metropolitan Medical Schools of England have this year in attendance 1,309 students, of whom 433 are "new entries." The number enrolled last year was 1,241. Guy's Hospital heads the list with 304 students, followed by St. Bartholomew's with 251, University College 207, King's College 110, and St. Thomas's Hospital 105. The other colleges, London, St. George's, Middlesex, St. Mary's, Westminster, and Charing Cross, have each less than 100 students.

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ART. I.—*Diffused Cerebral Sclerosis.* By WILLIAM A. HAMMOND, M. D., Professor of Diseases of the Mind and Nervous System, and of Clinical Medicine, in the Bellevue Hospital Medical College; and Physician-in-Chief to the New York State Hospital for Diseases of the Nervous System.

BY diffused cerebral sclerosis is to be understood a morbid condition of some part of the brain characterized by induration and atrophy of the tissue, and not distinctly circumscribed except by the anatomical limits of the region affected.

It is not a disease which can be recognized with any great degree of certainty or even of probability during life. It is, however, a well-marked pathological condition, giving rise to very prominent symptoms. Of late years the affection has not been much noticed, except incidentally, by a few writers of special treatises—though, under the name of "induration of the brain," it received considerable attention many years ago.

The symptoms by which it is characterized are by no means peculiar to it, though, when taken collectively, they give us some reason to diagnosticate sclerosis as their cause. A num-

ber of cases have come under my observation in which the lesion was probably diffused cerebral sclerosis; but I have never had the opportunity of verifying my diagnosis by post-mortem examination. The remarks, therefore, which I shall make on the morbid anatomy will mainly be based upon the studies and observations of other writers.

Symptoms.—The symptoms of diffused cerebral sclerosis, like so many other brain-affections, are connected with the mind, with sensibility, and with the power of motion. It generally makes its appearance during infancy, and produces an arrest of development in the part of the brain affected, and consequently in certain parts of the body. The initial phenomena are those of congestion and inflammation, during the course of which epileptic convulsions frequently ensue. These may be few in number, and may cease in a few days, or they may be very frequently repeated and last for several years, or during the whole life of the patient. The mind remains undeveloped, speech, if already acquired, often becomes imperfect, and, if not yet present, may never be commenced. The limbs, usually only on one side of the body, become paralyzed, and do not grow with the same rapidity as those on the sound side. Contractions are very apt to take place, from the fact, probably, that the normal degree of antagonism between the muscles is destroyed, and that those not so much paralyzed as others draw the limbs in the direction of their action. It is quite common, therefore, in the affection under consideration, to find the fingers drawn into the palm of the hand, the wrist flexed on the forearm, the forearm on the arm, and the arm drawn backward by the action mainly of the latissimus dorsi. In the lower limbs, club-feet are produced in a similar manner.

It is not uncommon, too, to find one or more senses weak or altogether lost, and the general sensibility of the body diminished on one side.

The urine and fæces are often passed involuntarily, or else the patient, from never having acquired a sense of propriety or cleanliness, passes them whenever he chooses, at any time or place.

With this general idea of the symptoms, I proceed to refer somewhat at length to its history, in the course of which I shall quote several cases in illustration of its progress.

The first to direct specific attention to the disease under consideration was M. Pinel,[1] the younger, who, in a memoir read before the French Academy of Sciences, May 27, 1822, brought forward several cases in illustration of what he denominated "induration of the brain." I quote the first case in full as a typical example of the affection:

Beler, aged eighteen years, an idiot from birth, was admitted into the Salpêtrière Hospital, June 1, 1821. The patient was paralyzed in the left arm and leg. She could not use this arm, for the hand was strongly flexed on the forearm, and could not be extended. She walked with great difficulty, dragging the left leg. Her intellectual faculties were very much restricted; she comprehended only the questions which were addressed to her relative to her health, her intelligence not extending beyond that point. She had also great difficulty in articulating the words yes and no, which were the only words she could speak. She had no particular habit, was always calm and tranquil, and had to be anticipated in all her wants. She was subject to occasional attacks of epilepsy; but, when the paroxysms came on, she had fits almost without intermission for thirty or forty hours. They returned about every twenty-five days. On the 4th of December, 1821, the patient was taken with a series of epileptic fits, almost continual in character, which lasted during four days, the paroxysms succeeding each other with inconceivable rapidity. During these continuous convulsions the right limbs were affected with violent movements. The left limbs, which had been paralyzed for a long time, were also strongly agitated, and the general sensibility was abolished. The face was red, the eyes were twisted, the dejections were passed involuntarily, the pulse was frequent and irregular, and the respiration unequal and jerking. The patient died on the fourth day, without there having been any remission in the symptoms.

Post-mortem Examination.—"General marasmus; remarkable emaciation of the paralyzed limbs. The cranium was thick, eburnated, and very hard to break. The meninges were pale

[1] Recherches d'Anatomie Pathologique sur l'Endurcissement du Système Nerveux. Journal de Physiologie de Magendie, t. ii., 1822, p. 191, *et seq.*

and healthy. The right lobe [hemisphere] of the brain was very much smaller than the left, it was atrophied; the convolutions were almost obliterated and very small, especially in the frontal and occipital regions. They were large and deep in the inferior part. The cortical substance was thicker than it generally is; the lateral ventricle was very small and dry. The substance of the brain, throughout the whole extent of this right lobe [hemisphere], and notably above the ventricle, was of remarkable hardness, and it was torn with difficulty by the fingers, the tissue separating in longitudinal bands which converged toward the corpus striatum.

"The left lobe [hemisphere] of the brain, much more developed than the right, was of the softness and consistence of the healthy brain-tissue, and this condition made the alteration in the right lobe [hemisphere] more obvious."

The rest of the description refers to other organs.

In regard to this case, M. Pinel remarks that to the pathological condition, the loss of the power of motion in the whole of one side, the almost complete annihilation of the intellectual faculties, and probably the epileptic fits, are to be ascribed. The condition—which is frequent with idiots, but of which it is often difficult to estimate all the various symptoms—is ordinarily revealed less by the paralysis of the limbs than by the distortions which it determines in the feet and the hands. Three other cases are adduced, in one of which the cerebellum was also in part indurated. M. Pinel, as the result of his observations of the morbid anatomy, states that the nervous tissue resembles a compact inorganic mass; its consistence and density are those of hard-boiled white-of-egg; the cerebral substance is atrophied; it appears entirely deprived of blood-vessels—the eye perceiving no trace of capillaries. The induration appears to affect more particularly the medullary substance than the gray substance; it was never observed in this last-named tissue.

Griesinger,[1] under the name of "diffused hypertrophy of the connective tissue of the brain," describes the affection now under consideration, and refers to an interesting case re-

[1] Die Pathologie und Therapie der psychischen Krankheiten. Zweite Auflage, 1861, p. 301. Also, New Sydenham Society translation, p. 359.

ported by Isambert,[1] in which a microscopical examination of the altered tissue was made. It occurred in an idiotic child, two years of age. The ventricular walls, the great ganglia, the pons and peduncles, were solid and hard; their tissue was elastic, like caoutchouc; the nerve-tubes in the white substance were almost completely destroyed and an amorphous granular substance occupied their place; there also existed newly-formed fibrous connective tissue. In regard to such cases, Griesinger remarks that, when we are told that a hitherto healthy and well-developed child, about the period of dentition, or during the second or third year, suddenly became feverish, was attacked with convulsions and delirium, fell into a slightly soporific state, and soon afterward apparently recovered, but with the intellectual and physical development checked, the condition may be due to one of two morbid processes: either there are slight congestion and inflammation of the membranes, or there is encephalitis, which, after passing out of the acute stage, suspends further development in the affected parts. The mind, therefore, ceases to expand; walking, if begun, is arrested; speech remains as it is, or is altogether lost; one side of the body does not grow so fast as the other; and convulsions, paralysis, and contractions, are present.

A case in point, referred to by Griesinger, I quote from Calmeil:[2]

"M. Alfred, born at Havre, single, aged twenty-two years, came to the Bicêtre, where he resided twenty-two months: he had been an invalid since infancy.

"Until about three years of age, he had exhibited no peculiarity as regarded intelligence—resembling other children of his years.

"At this period, however, he was attacked with measles, which was considered mild in form, and from which he had nearly recovered, when he was seized with a succession of severe eclamptic paroxysms. During twelve hours, it was impossible to rouse him from the coma, and general convulsions were present almost without interruption.

[1] Compt. rend. et Mém. de la Société de Biologie, t. ii., 1856, p. 9.

[2] Traité des Maladies Inflammatoires du Cerveau, Paris, 1859, t. ii., p. 411.

"The day after, it was perceived that he was deaf, blind, and incapable of articulating the least sound; the convulsions had ceased.

"At the end of fifteen days he recovered his hearing; after a year he could say a few words; but the retinæ continued insensible to impressions of light.

"It was now perceived that he walked with a certain degree of difficulty, and that he could hardly use the right hand. At times, also, he lost consciousness, but without falling, and it was subsequently recognized that these attacks were epileptic.

"Until the age of thirteen, the intelligence of M. Alfred underwent scarcely any development, and he remained imbecile notwithstanding all the efforts made for his improvement. He nevertheless acquired a knowledge of a certain number of words, and he could make himself understood whenever he had a want to gratify.

"At the age of nineteen he presented the symptoms of an almost complete state of idiocy. He comprehended some things, and could imperfectly articulate a few words. He was not evilly disposed, but he was incapable of attending to his person, and even of eating without assistance.

"He could take a few steps by supporting himself against the wall on articles of furniture or a cane, but he dragged his feet on the ground, and his right leg appeared to be weaker than the left. The right arm was contracted and almost immovable. Tactile sensibility was not affected anywhere. He did not appear to perceive objects placed immediately before his eyes and the pupils were dilated and insensible to the sudden accession of light. As regarded the bladder and rectum, he evacuated them without seeming to exercise the least restraint of cleanliness or propriety.

"The epileptic paroxysms occurred with long intervals between them, and presented no characteristics worthy of special mention. The complexion was pale, and the body emaciated and notably weak.

"During the month of January, 1827, there was frequent cough, combined with abundant expectoration, diarrhœa, and other symptoms of phthisis." He died in February of the same year.

Autopsy.—The whole of the right side of the body was much less developed than the left side. The right arm and leg were especially emaciated and thin. "The face was free from distortion, and the cranium, without being deformed, was small and very narrow. The greater part of the cranium was abnormally thick, and contained an excessive amount of calcareous matter.

"The dura mater was without change, and did not adhere to the osseous surfaces.

"A very considerable quantity of serum was infiltrated into the meshes of the pia mater—principally toward the middle and convex surface of the two cerebral hemispheres. The pia mater was thickened, but was not adherent to the convolutions.

"The left cerebral hemisphere was notably smaller than the right; the posterior lobe being particularly remarkable for its diminution. The convolutions were flattened, and were as thin as the blade of a knife, were resistant to the touch, and were of a clear yellow color. The middle and anterior lobes were neither of them of ordinary size.

"The posterior lobe of the right hemisphere was less developed than in a healthy brain, but the number of atrophied convolutions was small.

"On cutting into the left posterior lobe with a bistoury, its tissue was found to be white, compact, homogeneous, and very resistant. It might be said that the cerebral substance had become doughy, and that an element, foreign to its nature, gave it an excessive degree of hardness.

"On the right, the atrophied convolutions of the posterior lobe were difficult to cut; their structure was compact, but the induration of the nervous tissue did not extend deeply into the thickness of the lobe.

"In all other parts of the brain the white and the gray substance, as well on the left as on the right side, were apparently, in all respects, in a healthy condition.

"The corpora striata and the optic thalami were free from change either as regarded their volume or their structure.

"The pons varolii, the tubercula quadragemina, and the peduncles of the cerebrum, and cerebellum, were in a normal state.

"The spinal cord relatively, and perhaps even absolutely, appeared to be larger than was natural.

"The optic nerves were atrophied, of a glossy white color, and very hard."

Other cases, similar in general features, are adduced by Calmeil.

In the very interesting monograph of Cotard,[1] the relation of sclerosis to atrophy of the brain is clearly pointed out. As indicating a certain set of symptoms, in existence with a definite pathological state, I quote the following case, No. XXIX of his series:

"C., aged fifty-eight years, an inmate of the Salpêtrière since 1828, entered the infirmary April 25, 1865, under the charge of M. Charcot.

"She gave the following information, which she said she had from her mother, and from other persons who had brought her up: At the age of eighteen months she had three attacks of convulsions, which left her paralyzed on her right side. She had never had convulsions since. She had already begun to walk when the seizures took place, but she did not walk again till she was three years old.

"According to the information given by the superintendent of her ward, who had known her since her entrance into the hospital, her intelligence had always been weak; she was incapable of attending to herself; she could read tolerably well, and could sign her name; she had always spoken without difficulty.

"She had been employed with coarse sewing, and had invariably been docile and attached to those who took care of her.

"Her health had always been good, though she had, when about the age of twenty-five or thirty, several attacks of hysteria. Menstruation had been regular, and had ceased when she was forty-five.

"For about a year the patient had been the subject of frequent attacks of vomiting, or of epigastric pain. At the time of her admission to the infirmary, she was very much emaciated and very cachectic.

"Her intelligence did not appear to have been recently

[1] Étude sur l'Atrophie partielle du Cerveau, Paris, 1868, p. 49.

enfeebled; she could read, sign her name, and speak without difficulty.

"Her senses seemed to be intact; sight was good in both eyes, and the pupils were equal. There was no facial paralysis, and the tongue was protruded straight.

"The right arm was emaciated, atrophied, and contracted; the forearm was pronated and semi-flexed on the arm; the hand was flexed on the forearm, and inclined toward the ulnar side; the fingers were flexed in the palm of the hand, particularly the ring and little fingers; the index-finger was semi-flexed, and the thumb was extended.

"It was possible, without very great force, to bring the several parts of the limb almost into a state of extension, but, as soon as it was left to itself, it resumed its habitual position. The patient could execute a few movements with the shoulder and the elbow, but the wrist was absolutely paralyzed, and the fingers could only be moved to a very limited extent.

"The right leg was less atrophied, and there was no other deformity than a talipes equinus. The patient walked with a cane.

"The sensibility of the right side was intact, and no very notable difference of temperature was observed between the healthy and the paralyzed sides.

"The patient died May 17th, after symptoms of acute peritonitis.

"*Autopsy.*—Cancer of the stomach, circumjacent abscess, purulent peritonitis.

"No exterior deformation of the cranium; on the left side its walls were thick, doubly and triply so at some points; the frontal sinus extended to the left of the mesial line, and communicated with a large cavity situated in the orbital arch, which was composed of two thin osseous lamellæ.

"The left middle fossa was smaller than the right, and the right cerebellar fossa was smaller than the left.

"The dura mater being incised, a large quantity of serum escaped from the left side. The left hemisphere was very small, shrivelled, and in length and breadth scarcely two-thirds the corresponding dimensions of the right hemisphere. The convolutions were pressed together, were hard, and of a whitish color.

"On the external face of the middle lobe, behind the posterior marginal convolution, and on the prolongation of the fissure of Sylvius, there was a deep depression running upward and backward, and three or four centimetres in length. At the bottom of this depression the convolutions were reduced to little ridges, which were hard, and of a yellow color. The ventricle was considerably dilated; the corpus striatum did not appear to be perceptibly diminished in volume, but the optic thalamus was hardly one-fourth as large as that of the opposite side. There was considerable atrophy of the left crura of the fornix, and of the mammary tubercle.

"The olfactory and optic nerves of the left side were apparently healthy; the tubercula quadrigemina were not atrophied.

"The right hemisphere was healthy.

"The right hemisphere of the cerebellum and the middle cerebellar peduncle of the same side were atrophied."

Examined with the microscope, the indurated convolutions of the left hemisphere presented an enormous quantity of amyloid corpuscles and of nuclei of connective tissue.

The following cases I select from others of similar character which have occurred in my own practice:

Case I.—J. S., a boy, aged five years, was brought to me in the autumn of 1869, to be treated for epilepsy. The paroxysms occurred several times a day, and had originated when the child was two years of age, in consequence, as the mother thought, of a fall.

At that time he could say a number of words, and was rapidly learning to talk; his intelligence was good, and he had been walking for several months.

But after the first convulsion he ceased to speak and to walk, though he continued up to the time I first saw him to give his attention to very striking objects, such as noisy tops, bright-colored articles, and, above all, music and soldiers. During this period he had at least six exacerbations, characterized by pain in the head, repeated convulsions, and coma.

When he was about two years and a half old it was observed that he did not move the left arm and leg so freely as the right, and soon afterward he ceased to move them at all.

The toes then began to be drawn under the sole of the foot, and the heel was raised. Then the leg became flexed on the thigh, and soon afterward the fingers of the left hand and thumb were gradually bent so as to press strongly against the palm. The wrist followed, and then the forearm. Both limbs were greatly atrophied.

When he came under my examination he was having epileptic convulsions, both of the *grand* and *petit mal*, every day. There was no deformity of the skull, though it was certainly small for his age. His mind was feeble, and he did not give attention to any remarks made to him, but bright objects at once attracted his gaze, and he made efforts to get hold of them.

I examined the fundus of the eyes with the ophthalmoscope, and discovered an anæmic condition of the retinæ and atrophy of both optic disks.

I gave it as my opinion that the child was suffering from diffused cerebral sclerosis, involving the left hemisphere; and that there was scarcely any prospect of material amelioration in his mental or physical condition.

Case II.—A female, aged eight years, entered the New York State Hospital for Diseases of the Nervous System, June, 1870, having previously been a patient at my clinic at the Bellevue Hospital Medical College. When quite an infant she had suffered from epileptiform convulsions, which had been almost immediately followed by paralysis of the right upper and lower extremities. The convulsions recurred at short intervals, and atrophy of the paralyzed limbs, with contractions of the fingers, hand, and forearm, supervened. She learned to walk, however, quite well, and also to talk without any very notable defects.

Her mind was weak, and she was extremely silly in her behavior; she had never learned to read.

Under the use of the bromide of potassium her epileptic paroxysms ceased, but the contractions and atrophy of the right arm resisted long treatment by galvanism and mechanical appliances. The leg acquired much more power under the treatment than it had previously possessed.

Case III.—W. W., a gentleman, aged forty-three, came to

me, December 11, 1869, to be treated for what his physician and friends regarded as softening of the brain.

About six months previously he had experienced, on awaking in the morning, great difficulty in extending the left hand and fingers, and through the whole day there was a decided tendency manifested for the latter to close and the hand to be flexed upon the forearm ; and this gradually, day after day, became stronger, till at last neither the hand nor fingers could be extended.

Then the corresponding lower extremity became involved in a similar manner, and about a month after noticing the first symptom he had an epileptiform convulsion, and this was repeated twice the following day. Since then the fits have occurred at intervals of four or five days. With the contractions in the limbs of the left side there was gradually-advancing paresis until, when he came under my observation, both arm and leg were almost completely paralyzed. Atrophy of both extremities was present to an extreme degree, and sensibility and electro-muscular contractility were almost entirely abolished.

His mind was also notably impaired. He laughed immoderately at every question I put to him, and had a decided expression of imbecility. His speech was not affected to any remarkable degree, except as regarded extreme slowness of utterance. He had previously to his illness been a ready and quick speaker. My diagnosis was diffused cerebral sclerosis, and I gave an unfavorable prognosis. The treatment, which will be considered under its proper head, was, however, successful to a very considerable extent.

It will be seen, from the foregoing account of the symptoms, that diffused cerebral sclerosis is characterized mainly by weakness of intellect, paralysis, and muscular contractions.

Causes.—The predisposing causes of the affection under consideration are not thoroughly understood. The disease appears to be much more frequent in infancy, although it lasts to the period of old age, and sometimes originates at an advanced time of life.

The exciting causes are likewise imperfectly known. Injuries of the skull from falls or blows and hæmorrhagic cysts

appear to have some influence in originating the disease, but more generally it is developed, so far as we can perceive, spontaneously.

Diagnosis—The diagnosis of diffused cerebral sclerosis must always be more or less uncertain, for the reason that the symptoms are met with in other very different affections. In children a similar set of phenomena may be the consequence of arrest of development in the brain without any alteration of its structure recognizable by our means of observation. In the case of an idiotic child affected with convulsions, hemiplegia, and muscular contractions, I found, on post-mortem examination, the left hemisphere markedly smaller than the right, but I could detect no change of any part of its structure.

Symptoms like those met with in diffused cerebral sclerosis may result from brain-tumors of various kinds.

In adults the disease is readily discriminated from cerebral hæmorrhage and embolism by the gradual character of its advance, and by the mental symptoms being more strongly pronounced. But from softening the diagnosis cannot always be made out, and an opinion must be formed from the history and phenomena in each individual case.

From thrombosis the diagnosis is equally difficult. Perhaps the distinction may be made both as regards softening and thrombosis by the facts that, though contractions are met with in both these diseases, they are not such invariable accompaniments as they are in diffused cerebral sclerosis, and that they are never, as occasionally in the latter affection, a primary symptom.

Prognosis.—The prospect of complete recovery is very gloomy, and even amelioration has hitherto been regarded as out of the question. I am inclined, however, to think, as the result of my own experience, that the condition of patients, apparently suffering from the affection in question, may be decidedly improved by suitable medical treatment. I have several times succeeded in arresting the convulsions, strengthening the mind, increasing the strength and sensibility of the paralyzed members, and relaxing the contractions. My success has been much more decided in cases which had originated late in life—probably, for the reason mainly that the disease was seen earlier in its course.

Morbid Anatomy.—This division of the subject has already been considered incidentally, to some extent, in the remarks made under the head of symptoms, and in the detail of cases quoted.

The most obvious feature detected by ordinary observation is the increased hardness and density which the cerebral tissue has acquired. This generally occupies a considerable portion of one lobe, or may extend through the whole of it, or may even affect a whole hemisphere. It is not distinctly circumscribed, but diminishes in intensity from the centre to the periphery, and, according to Pinel, never invades the gray substance.

The increased density is attended with atrophy when the disease affects the adult, and with atrophy and arrest of development when children are its subjects.

In order to understand the essential nature of the morbid process which causes the brain to become indurated, a few words in regard to cerebral histology are necessary.

Besides the nervous tissue of the brain, there is another anatomical element present which fulfils the function of binding the cells and fibres together, and giving the whole substance its normal degree of consistence. According to Virchow,[1] this, although analogous to, is different in some respects from ordinary connective tissue. He gave to it the name of neuroglia or nerve-cement.

Diffused cerebral sclerosis consists in the hypertrophy or increased formation of this tissue, and the atrophy or disappearance of the proper nervous substance. Atrophy of the brain may, however, be due to other causes than sclerosis, as in the case reported with great minuteness by Schroeder van der Kolk,[2] and several of those cited by Lallemand,[3] Turner,[4] and other writers.

Pathology.—The symptoms which result from diffused cerebral sclerosis are those which we might expect to be the con-

[1] Cellular Pathology, Chance's translation, London, 1860, p. 277.

[2] A Case of Atrophy of the Left Hemisphere of the Brain, etc. New Syd. Soc. trans. London, 1861.

[3] Op. cit.

[4] De l'Atrophic partielle ou unilatérale du Cervelet, etc. Paris, 1856.

sequence of a condition which essentially consists of a disappearance of that part of the brain-tissue capable of producing or transmitting nervous force, and the substitution of another histological element which is of secondary importance. They all indicate deficient cerebral power. It is with the brain as with a muscle undergoing atrophy: less force results from its action in correspondence with the advance of the process by which the characteristic anatomical elements disappear.

Doubtless, if we had the opportunity of more thorough study of the symptoms of diffused cerebral sclerosis, and comparing them with the condition of the brain as found by post-mortem examination, we should find that they varied considerably in character, according to the part affected, and we should probably have reason to believe that the nervous cells which had disappeared—motor, sensitive, or trophic—were in exact pathological relation with the symptoms observed. This special point has been well studied by MM. Duchenne de Boulogne and Jouffroy,[1] in a recent paper, devoted to a somewhat different disease, and to which I have recently been enabled to add a few important data.

Treatment.—This division of the subject has scarcely received any attention from authors. My experience, however, has sufficed to convince me that we can occasionally improve the condition of the patient.

If there are epileptic convulsions, they may be prevented by the administration of the bromide of potassium in doses of at least twenty grains, three times a day, to an adult. Larger doses may be necessary. On the cessation of the convulsions, it will sometimes be found that the intelligence at once begins to be developed.

The paralysis and contractions may sometimes be lessened by the persistent use of both the induced and primary galvanic currents. The first named will often in the beginning fail to act upon the muscles, in which case the latter should be employed. This is always better for the contracted muscles than the induced current. For the relief of the paralysis it should

[1] De l'Atrophie Aiguë et Chronique des Cellules Nerveuses de la Moelle et du Bulbe Rachidien, etc.: *Archives de Physiologie*, No. 4, Juillet et Août, 1870, p. 499.

be interrupted, for the relaxation of contractions it should be constant.

As regards the central lesion, I think it may occasionally be reached, when it has not had time to become very extensive or profound. And the best and really only means I know of are the primary galvanic current passed through the brain, and the administration of the chloride of barium.

In using the galvanic current, the electrodes—wet sponges —should be applied over the mastoid processes, and kept there for a period not exceeding three minutes. Fifteen of Smee's cells will afford a current of sufficient intensity. The application should be made about every alternate day.

The chloride of barium may be given in doses of about a grain three times a day. I usually administer it in solution, according to the following formula: ℞. Barii chloridi ʒ i, aquæ dest. ℥ i, M. ft. sol.; dose; gtts. xii. three times a day.

I am unable to say that these measures have actually removed the supposed sclerosis of the brain, and caused the reformation of the atrophied cells, but I am very sure that symptoms such as are attendant upon diffused cerebral sclerosis have several times been measurably dissipated by it sinfluence. Thus, in the third case mentioned as occurring in my practice, the mind improved, the epileptic paroxysms ceased, the contractions were relaxed, the paralysis lessened, the affected limbs increased in size, and the further progress of the disease was arrested. At the present date (December 30, 1870) the gentleman is able to take care of himself, to walk tolerably well, and to use the formerly-paralyzed arm for many purposes. In three other cases a like treatment has been productive of almost as marked a degree of benefit.

Art. II.—*The Ophthalmoscope in the Treatment of Epilepsy.*

By Reuben A. Vance, M. D., Attending Physician for Diseases of the Nervous System, at the Out-door Department of Bellevue Hospital, etc., etc.

Those who have had occasion to treat a large number of cases of epilepsy, and have employed the bromide of potassium in so doing, must have had their attention drawn to the

following phenomena: Certain cases have steadily improved from the commencement of treatment, while others, comparatively few in number, have as steadily grown worse. As a general rule, but one to which there are many exceptions, it can be said that the first class is characterized by the diurnal character of the attacks, and the latter by their occurring at night. Furthermore, it will be no new thing to say to those who have attentively watched their cases, that in many instances, after a period of freedom from the disease, that varies from a week to many months, and while the remedy is still being faithfully employed, the paroxysms return, altered in character, it is true, but as distressing in their results to the mind and body of the patient as ever. Excluding those cases in which exceptionally bad results can be ascribed to an inferior quality of the drug, bad hygienic surroundings, and want of proper care, there still remain a sufficient number of reliable examples to justify one in saying that, in certain cases, the bromide of potassium always makes the patient worse; certain others, in which its good effects are permanent; while in others, again, although it may relieve the patient temporarily, its persistent employment is followed by a return of the disease in as bad a form as ever. The questions then arise, What is the essential difference in the character of the disease, that some of its subjects should be benefited by a method of treatment that injures others? Why should the same drug, in similar quantities, permanently cure one patient, and only temporarily relieve another?

I have made some rather extensive observations on this subject, and think that I have arrived at results which may, in a measure, tend toward the solution of these questions.

Cases of epilepsy have been arranged in many different ways for purposes of scientific study. This is indicated by the many names applied to its different phases: nocturnal and diurnal epilepsy apply to the *time* of the attacks, while the designations *petit mal* and *grand mal* indicate differences in the *character* of the paroxysm. According to the efficacy of therapeutical measures, some authors describe an idiopathic and symptomatic epilepsy—the latter curable, the former not so. Any system of classification is justifiable which is based upon

some important peculiarity, especially so when that peculiarity is an indication for treatment. For the last two years I have almost unconsciously fallen into the habit of mentally arranging my patients according to the intraocular appearances observable with the ophthalmoscope. Two well-marked groups can be thus formed: one group characterized by vascular fulness, the other by anæmia of the retina. As the retinal vessels are direct continuations of an important branch given off by the internal carotid within the cranial cavity; as both arteries are supplied by that nerve—the sympathetic—whose function is to regulate the diameter of the vascular trunks to which it is distributed, and whose controlling influence is manifested by an increase in the size of the retinal vessels by influences—as emotional activity—competent to increase the quantity of blood within the brain, as well as by the fact that they diminish in size under the operation of medicines which have the power to produce cerebral anæmia—no inference can be more plain to my mind than that, in cases where there is no local disease to affect the vascularity of the eye, the condition of the retinal vessels must be taken as indicative of the blood-supply of the brain. There being nothing about the eyes of the patients, hereafter referred to, which indicated local disease, I concluded that the ophthalmoscopic appearances were, in the one case, due to cerebral congestion, and in the other to cerebral anæmia. In other words, that the efficient cause of the paroxysms was, in one class of cases, an excessive amount of blood circulating through the brain; while, in the other cases, the opposite condition—an anæmic state—gave rise to the epileptic phenomena.

Without entering upon any discussion as to the essential nature of epilepsy, or even as to its seat in the nervous system, I will confine myself to questions that admit of no difference of opinion. It is a matter of observation that certain forms of epilepsy occur principally, or exclusively, at night, and at that particular hour of the night which marks the advent of sleep. Now that the condition of the cerebral circulation during sleep is so well known, but few will be disposed to doubt that the occurrence of the paroxysms, at this particular time, bears a causative relation to the state of the cerebral circulation, especially when measures, calculated to overcome the anæmic

state, naturally produced by sleep, prove efficient in mitigating or preventing the epileptic attacks. Thus, as regards the efficacy of anæmia as a cause of the manifestations of the paroxysms, no doubt can be entertained. In the same manner, ordinary observation will show that cerebral hyperæmia is an important factor in producing the same result. It is only necessary to call attention to those sufficiently common forms of the disease in which every thing like emotional excitement has to be avoided, under penalty of an aggravation of the symptoms—to those cases in which the paroxysms are diurnal in character, and those patients who are improved or cured by means which demonstrably diminish the quantity of blood circulating through the brain. How hyperæmia or anæmia acts to produce an epileptic paroxysm has not been satisfactorily explained, but, that these radically opposite conditions are competent to give rise to the same symptoms, is a fact as old as medicine itself.

The following cases, which came under my observation in January, 1870, are selected for the reason that they have been under treatment just about one year, and that during the whole of that time they have each been seen and ophthalmoscopically examined several times a month. I have noticed, as pertinent to the present inquiry, only those points that bear upon the questions at issue:

1. J. O. H., aged twenty-seven. Fits occur both by day and night; intraocular congestion; disease of six years' duration. Fits occur about once a week.

Has had no paroxysm since treatment was commenced early in January, 1870. Prescription used:

℞ Potassii bromidi ℥ i.
Aquæ ℥ iv.

M. Dose, a teaspoonful three times a day. Within a week after treatment commenced, the eye resumed a healthy appearance, which it retains to-day.

2. H. M., aged nineteen. Fits occur only by day. Ophthalmoscope reveals congestion of the disk and retina; two years' duration; six fits a month.

Same treatment as above. Paroxysms ceased, and the eye became much less congested. In April, while examining retina with ophthalmoscope in my office, he had an attack of *petit mal*. During the attack, and ten

minutes subsequently, the retinal vessels were extremely small, and the parts anæmic. He continued with the bromide in the same doses, and within a week had a very large number of fits one night. They returned every subsequent night, until I again saw him, when, upon stopping the bromide and substituting twenty drops, three times a day, of solution, containing one grain strychnia to the ounce of water, his fits ceased. Upon examining the retina with the ophthalmoscope, before commencing the strychnia, the intraocular structures were found to be highly anæmic. He was ordered to follow this plan: For three weeks of every month to take the bromide, but the fourth week the bromide was to be stopped, and the strychnia solution, in the former doses, substituted. He has had no more paroxysms, and on December 12, 1870, his eye presented a perfectly natural appearance.

3. J. C., aged thirty-seven. Fits occur both by day and night. Congestion of the retina; fifteen years' duration; fits two and three times a week.

This man took more of his medicine than was ordered. Instead of a teaspoonful of a solution of the bromide, he took twice and thrice that quantity. The fits ceased after the first dose, but were absent not more than three weeks, when they returned with great violence and in larger number. They occurred either exclusively by night, or immediately upon arising in the morning—never later in the day, as they formerly did. The ophthalmoscopic appearances, when I first saw him after this relapse, were peculiar. The veins of the retina were enlarged, tortuous, and irregularly dilated, while the arteries were almost imperceptible. A solution of strychnia (2 grs. to ℥ i) was administered in doses of ten drops, three times a day, for a week. For three months he took the strychnia and the bromide on alternate weeks. At present he is taking the bromide in half-teaspoonful doses, and has had no more paroxysms.

4. J. R., aged forty-nine. Fits day and night; anæmia of intraocular structures; twelve years' duration. Fits twice a week.

A solution of bromide of potassium, of the same strength as that used in the other cases, was prescribed. The patient took but five doses, when the fits returned with unusual severity, and succeeded each other very rapidly. By the advice of his family, he stopped the remedy. When I next saw him the ophthalmoscopic appearances were changed in this respect; the veins were enlarged and tortuous, while the arteries remained quite small. A solution of strychnia, of the same strength as in other cases, was given in doses of ten drops three times a day, and under its use the paroxysms return about once a month.

5. M. J., aged ten. Fits day and night; congestion disk and retina; fits of two years' duration; occur many times in the twenty-four hours.

In this case the paroxysms were readily controlled by the bromide, but the disease manifested itself again in March. In the latter part of February I examined the intraocular structures and, finding them exceedingly anæ-

mic, diminished the dose of the remedy; the next time I saw the patient she came to report a return of the convulsions. On this occasion I was struck by the difference presented, on ophthalmoscopic examination, from what I had seen a week or ten days before. Instead of a general diminution in the calibre of the vessels, I found the veins unusually large and tortuous, while the arteries were scarcely perceptible. She was placed upon strychnia, in appropriate doses, and the bromide stopped. After the expiration of a week the bromide was resumed, and the patient directed to call each week for examination. She has been faithful in attendance, and, although I have judged it prudent, from evidences of excessive action of the remedy, observed by the ophthalmoscope, to vary the treatment, she has had no further return of the disease.

In considering the foregoing cases, the first point to be noted is the use of the ophthalmoscopic appearances presented by the intraocular structures as regards vascular fulness, in determining the treatment to be pursued. These were accepted as indicative of the cerebral blood-supply, and the treatment adopted accordingly. It is true that, in Case No. 4, where the anæmia was marked, the bromide was administered, but the result was such as to make a speedy change in the remedy employed. In all the cases of congestion, a good effect was at once apparent upon the administration of the bromide, and in those cases in which the benefit was permanent the circulation of the eye was brought into such a state as to indicate a natural condition of the cerebral circulation. Furthermore, as long as this natural condition was maintained, the fits did not recur; but when the drug was continued until an undue effect was produced—indicated by anæmia of the intraocular structures—the convulsions returned, generally with augmented violence. Another point to be noticed is, the effect of a series of convulsions upon the intraocular circulation. No other phenomena are noted in the above cases than an increase in the size and tortuosity of the retinal veins. This is of importance, for the reason that, from a superficial examination, this appearance might be accepted as an indication of cerebral congestion. In Case 5, it will be seen that, as treatment progressed, anæmia, denoted by a diminution in the size of both arteries and veins, became more and more apparent, but, upon the occurrence of several paroxysms, the veins assumed the dilated and tortuous appear-

ance above described. The arteries, however, remained unusually small. The changed shape of the veins was clearly due to the commotion excited by the violence of an epileptic paroxysm.

It will also be seen that the diurnal or nocturnal occurrence of the paroxysms cannot be accepted as positive evidence of the vascularity of the brain. While it is true that the exclusive occurrence of the fits by day would afford a strong presumption of their having a condition of hyperæmia as a cause, it will be readily seen, after a moment's consideration, that this same condition is competent to produce the paroxysms by night as well. After a series of attacks, the cerebral vessels, from the mechanical distention to which they are subjected by the interruption of the return of blood from the brain by the spasms of the muscles of the neck, become dilated, their muscular walls are paralyzed, and a condition favorable to the production of stupor induced. While the patient remains in this state, the paroxysms return by day or night indifferently, there being but little change in the blood-supply of the brain during the twenty-four hours. It is, probably, this same condition, produced in the same manner, which in certain cases of nocturnal epilepsy, having an anæmic origin, causes the paroxysms to eventually make their appearance by day as well as by night.

Did space permit, I could cite a very large number of cases of epilepsy observed in this manner, in which, practically, the same results were obtained. Many of them show other ophthalmoscopic appearances than mere changes in the vascular supply of the intraocular structures, but a consideration of them is foreign to the objects of this article. The above are sufficient for my present purpose, and it is an easy matter for any physician, skilled in the use of the ophthalmoscope, to satisfy himself that what is asserted of them will be found true of the large majority of epileptics submitted to this treatment.

Why is it that certain cases of epilepsy are cured by the administration of the bromide of potassium? Simply because they have, as their efficient cause, a congested condition of the brain, which the bromide of potassium, properly administered, tends to relieve.

Why is it that certain other cases are made worse by the bromide, and benefited by such remedies as strychnia and belladonna? For the reason that their efficient cause is an anæmic condition of the brain which the bromide aggravates. The good effect of the other drugs is to be ascribed to their power of producing a hyperæmic condition, which counteracts the preceding anæmia.

Why is it that the bromide relieves for a while, and then, apparently, fails in its power—the fits returning in an altered form? The answer to this is, that the remedy, by its excessive action, tends to produce an anæmic state of the brain, which causes the return of the convulsions.

To prevent misconception, I do not desire to be understood as saying that every case of epilepsy can be cured by attention to the state of the cerebral circulation, and treatment directed in accordance therewith. Daily experience teaches the contrary. While such diverse lesions as a cancerous tumor of the brain, and the unfelt irritation of a bit of gravel under a toe-nail, are characterized by epileptiform seizures, such a result is impossible. Yet, I am fully convinced that even the most unpromising cases may be relieved, and their unfortunate condition very much mitigated, by systematic and careful attention. I have under my professional care, at the present time, a little girl from Williamsburgh, who, four years ago, sustained a severe injury of the head, which gave rise to extensive necrosis of the frontal and parietal bones. A year ago she was having epileptiform attacks at the rate of a dozen a day. No one who then saw the child imagined that any thing short of trephining would do her any good. Yet, under the careful administration of bromide of potassium, she has completely recovered.

ART. III.—*Catarrhal and Croupous Inflammation of Mucous Membranes.* By SAMUEL G. ARMOR, M. D., Professor of the Principles and Practice of Medicine and Clinical Medicine in the Long Island College Hospital, Brooklyn, N. Y.[1]

GERMAN and other Continental writers and teachers are giving unusual prominence to the study of morbid states

[1] This paper was read before the Kings County Medical Society.

of mucous membranes, and, with new and extended pathological views, are attaching to certain terms, long in use, a signification unwarranted by our current English literature. This is especially the case with Felix von Niemeyer, author of the excellent "Text-Book of Practical Medicine." American and English practitioners, who have been educated in a different school, cannot read this work, for the first time, without being unpleasantly reminded of a change in the nomenclature of disease. Thus, the terms "catarrhal" and "croupous" inflammation of the lungs, "catarrhal" inflammation of the stomach, bowels, kidneys, bladder, and uterus, sound strangely to those whose nomenclature confines these morbid states to the *upper portion* of the respiratory mucous membrane.

If there is nothing gained in clearer and more truthful conceptions of definite morbid states by this greatly-extended application of these terms, they should be rejected, as tending to unnecessary confusion. Whether this be so or not, whether our author has been unhappy, or otherwise, in the selection of his terms to describe certain morbid states of mucous membranes wherever found, it is but justice to the fame of one of the most illustrious teachers of Europe that we should clearly comprehend what he means by these terms before we condemn his nomenclature as a mischievous innovation.

That he may not be misunderstood, he takes occasion to state, in the very first chapter of his book, that he does not limit the term "catarrh" to "that class of inflammations of the mucous membranes acquired by 'taking cold,' and to relieve which one wears flannel and drinks elder-blossom tea." And, that he does attach to the term certain definite and well-defined ideas, can be readily seen from his etiology of "*acute gastric catarrh.*"

Among the exciting causes of this he enumerates: 1. Large quantities of food—more than the gastric juice can dissolve. 2. Food difficult of digestion—the products of its decomposition, when partly digested, giving rise to catarrh. 3. Substances which have begun to decompose before entering the stomach, such as spoiled meat, sour milk, etc. 4. Irritants, including hot articles of food, some medicines, alcohol, spices,

etc. 5. Substances that weaken the digestive power of the gastric juice, or retard the movements of the stomach.

Now, it will be observed that all these exciting causes are such as give rise to very common forms of *indigestion* and *dyspepsia*. It is evident, however, that he means by "gastric catarrh" a condition similar to, if not identical with, that described by other authors as "*subacute or chronic inflammation of the stomach.*" For, in a separate chapter on dyspepsia, he says he "shall only speak of those disturbances of digestion which arise without perceptible change of structure of the stomach."

The question at once presents itself, therefore, as to whether there is any thing gained in clear conception of certain morbid states by the use of the terms "catarrhal" and "croupous," over that of unqualified inflammation of mucous membranes. Evidently there is; for the reason that they point out a definite pathological condition peculiar to *mucous membranes alone.* "Catarrh consists in engorgement of the blood-vessels of any mucous membrane, accompanied by abnormal secretion, swelling, succulence of its tissues, and copious generation of young cells."

In another connection Niemeyer more specifically defines catarrh as consisting in:

1. Hyperæmia.
2. Abundant flow of mucus.
3. Increased detachment of epithelium.

The lesions are here concisely stated; they describe a definite condition, and are easily understood; to them, in the associated order here presented, the simple term *catarrh* is applied: it is a condition affecting mucous membranes in every locality.

Hyperæmia, it will be remembered, may exist in two distinct forms—healthy and morbid. In the gastric mucous membrane, physiological hyperæmia takes place every time food is taken into the stomach; in other mucous membranes, with few exceptions, this same hyperæmia is morbid. It is only when the physiological process increases beyond *normal* limits in the stomach, or any other mucous membrane, that the condition exists which is described as catarrhal.

We shall, of course, fail to comprehend abnormal conditions of mucous membranes if we do not clearly comprehend the fact that mucus, as a *copious fluid secretion*, is a distinctly morbid condition of the tissue. The natural secretion of a mucous membrane is its epithelium, and every thing beyond this is, just so far, morbid.

The globules which are seen in mucus under the microscope are, according to Henle, substances which, in the normal state of typical perfection, would form epithelium. Their natural history, undisturbed, is a gradual approach to the free surface of the tissue, during which they are dried, compressed, and elongated into flattened, cylindrical, or stratified forms of pavement epithelium. Under the spur of excitement, in hyperæmic conditions of the membrane, these young cells are prematurely moulted off in every stage of development—born before their time—" infant tissues strangled in their birth."

In studying the subject, therefore, we start with the simple elementary forms of mucous corpuscles, and follow them through their several stages of development; bearing in mind the fact that mucus, as a copious secretion, is one of the first results of hyperæmia. We recognize the mucous fluxion as a distinctly morbid condition which is often curative of the lesion which produces it. In temporary congestion of mucous membranes the mucous flow is often the only morbid manifestation ever present.

But, in more active and persistent excitement, pus becomes mingled with mucus, so that we have the characteristic mucopurulent discharge (mucous and pus corpuscles). Pus-cells, mucus-cells, and epithelial cells are, I believe, now regarded by histologists as equivalent elements, which, under certain circumstances, may replace one another. Physiologically, however, they are known to be distinct elements. What are the conditions, therefore, under which this replacement takes place? While awaiting the final decision of histologists on this question, we simply affirm that, as seen on the free surface of irritable and inflamed mucous membranes, mucus and pus exist only as products of morbid hyperæmia.

As to the origin of the pus-cell, as a morbid product, physiologists, at the present time, recognize at least two distinctly

different modes of formation. In the *first*, the growth of the pus-cells proceeds from the germs of superficial tissue (*epithelium*); in the *second*, from *connective tissue.* To these may be added a *third*, according to the views of Waller, Cohnheim, and others, based upon the alleged discovery of stomata, or pores, in the walls of blood-vessels which admit the exit through them, in inflammation, of white "migratory" blood-cells (leucocytes), these undergoing further metamorphosis into ordinary pus-cells.

All these views, it will be seen, regarding pus formation, are based upon the essential fact that all new cells proceed from other cells, or from the nuclei of them. We may not be able, in all cases, to distinctly trace, through multiplied divisions and subdivisions of dividing nuclei, the origin of the pus-cells; we simply affirm their *cellular* origin, and their intimate relationship to mucus-cells, epithelial cells, and "migratory" white blood-cells found in inflamed blood-plasma. It is with the relations of these products of inflammation, however, to mucous membranes that we are principally concerned at present.

In studying the subject, we start with the simple statement, already made, that epithelium is the natural secretion of a mucous membrane. Now, in certain morbid states of hyperæmia, this epithelial covering becomes less and less characteristic; the mucous corpuscles are hurried from the surface before they have time to undergo their normal changes of development; they drop off in every stage of abortion; mucus begins to assume the physical characters of pus; the true inflammatory process is established; so that we often have, on the free surface of the inflamed membrane, variously combined, all the gradations between epithelial cells, mucus-cells, pus-cells, granule-cells, and "inflammatory globules."

With these varied forms of cell-growth there exist great differences in the quality and tendencies of the fluid effused on the free surface of the membrane. Rokitansky describes the typical forms of the more organizable products by the terms *fibrinous* and *croupous*, and these terms are generally adhered to by German writers. Williams and other English writers apply to the same conditions the terms *plastic* and *aplastic*.

The character of the exudates depends, of course, upon the character of the cellular elements entering into their structure. The larger the proportion of corpuscles, for instance, the greater is the tendency to the formation of unorganizable pus rather than the more organizable forms of croupous exudates; whereas, in "adhesive inflammations," there is preponderance of blood-cells, "inflammatory corpuscles," and fibrillated material characteristic of plastic lymph, which may become "nidus substance taking some share in the growth of new elements, like the natural connective tissue of the body."

In true *croupous* inflammations, amorphous or finely-fibrillated plasma rapidly assumes, after exudation, the form of a low organization, but it involves, according to Niemeyer, the *epithelium only*, and its tendency is to assume, more and more, the character of pus. Hence, after a longer or shorter time, the croupous membrane may be readily removed, and leaves no loss of substance after removal.

In *diphtheritic* exudates, on the other hand, the newly-formed structure does not lie on the *surface*, but enters into the substance of the tissue. It is not, therefore, easily removed, and, when separated, it is in the form of a "diphtheritic slough," resulting in superficial gangrene of the mucous membrane, and the formation of a so-called diphtheritic eschar.

Rokitansky also describes an *albuminous* exudation, which appears to be identical with the lower varieties of the croupous form, and modified, in some degree, by occurring in depressed conditions of the system.

With these general elementary facts before us, I venture to suggest, by way of systematizing and generalizing our knowledge, a classification of acute morbid states of mucous membranes something like the following:

1. Catarrh.
2. Suppurative inflammation.
3. True croupous inflammation.
4. Diphtheritic inflammation.

The natural history of acute inflammations of mucous membranes is about in the order here presented, and the care-

ful study of the special conditions giving rise to each type of inflammation cannot fail to dispel much of the fancied "mysticism" of the new German pathology.

By reference to the several conditions here named—passing from the simple to the more complex—we cannot well fail, for instance, to understand what Niemeyer means by the varieties of pneumonia he describes, namely, croupous, catarrhal, and interstitial pneumonia.

In *croupous* pneumonia (one of the most common diseases of adult life, according to Niemeyer) rapidly-coagulable exudation is thrown out upon the free surface of the air-vesicles, involving their epithelium; in the *catarrhal* variety, which is intimately related to capillary bronchitis, and, of course, somewhat peculiar to childhood, the process is, in some respects, similar to the croupous, but no *coagulable* exudation is formed; while in *chronic interstitial* pneumonia the inflammation involves the walls of the air-vesicles and the interlobular connective tissue.

According to the distinctions here made, it will be observed that, in the *croupous* and *catarrhal* varieties of pneumonia, the pulmonary tissues themselves suffer little or no nutritive disturbance; while in the interstitial variety it is the intercellular and interlobular connective tissue which is the seat of inflammation.

Catarrh of the intestinal mucous membrane differs in no essential particulars from the same state in the mucous membrane of the respiratory track, and here, as in every locality, it is the result of *hyperæmia*, whether produced from purely mechanical or local causes. As an intestinal lesion it constantly accompanies obstruction of the circulation of the liver, and all causes which give rise to *local irritation*. The acute form of the disease usually manifests itself by more or less diarrhœa. But the chronic form of the disease, when located in the small intestines, and occurring in adult life, is rarely accompanied by extensive serous transudation into the bowels; on the contrary, constipation usually prevails.

In some cases, distinctly croupous casts are found in the large intestines, as in the bronchial tubes; in others the inflammation has a diphtheritic character. This latter condition

has been especially observed in epidemic dysentery. It is not unusual, in this form of the disease, to find the diphtheritic exudate deposited in the tissue of the membrane; so that, when it is sloughed off, there is superficial gangrene, followed by erosion and loss of substance in the mucous tissue. The same condition may lead to diffuse and follicular ulceration of the intestine; and, not unfrequently, it extends to the entire wall of the cæcum, giving rise to what is known as *typhlitis stercoralis.*

In sporadic and epidemic cholera, cholera infantum, and all forms of abdominal disease characterized by rapid transudation of the watery elements of the blood, the processes, already described and classified as "catarrhal," are all quickened; the cellular elements of blood-plasma are thrown too rapidly on to the free surfaces to form mucus, or pus, or even croupous and diphtheritic exudates: these require time—less, it is true, than to form normal tissue, but still they are the products of a comparatively slow process.

There is another intermediate form of intestinal catarrh, in which the condition of hyperæmia is followed by slowly-oozing elements of blood, which, mingling with lactic and other acids secreted by mucous membranes, give rise to the peculiar *green discharges of childhood.* The essential characteristics of these discharges are simply such as pertain to catarrhal and croupous exudates of mucous membranes in every locality; they will be found to contain altered blood-plasma, epithelium, mucus, and young blood-cells in every stage of degeneration.

I have already alluded to the fact, important in a diagnostic point of view, that chronic catarrh of the small intestines may exist without increased pro-fluvia from the mucous membrane. We can only infer its existence from a general class of symptoms, and these relate chiefly to functional disturbances of the *liver.* It is now well understood that acute or chronic gastro-duodenal catarrh is at the foundation of nearly all "biliary derangements." The acute variety is, of course, easily detected; but chronic duodenal catarrh is often overlooked. We infer its existence mainly from a general class of symptoms, such as impaired appetite, deranged secretions, slimy-coated tongue, bad taste, highly-colored urine,

dingy complexion, fermentation and decomposition of the intestinal contents, flatulence, constipation, mental despondency, hypochondria, and a host of anomalous and unpleasant nervous disturbances. Catarrh of the gastro-intestinal mucous membrane cannot exist as a chronic affection without involving the mucous membrane of the ductus choledochus and its branches in the same morbid condition. These ducts being small, and destitute of contractile elements to urge their contents onward, the bile is easily obstructed by the swollen and hypertrophied membrane, and the tough, viscid secretion on its free surface.

There can be no doubt, therefore, that chronic gastro-intestinal catarrh sustains a direct causative relation to most of our so-called "bilious" diseases. Nor can there be any doubt, in my judgment, that most, if not all, of our popular "cholagogues," so far as they act curatively, do so by their direct impression on this morbid condition of the duodenal mucous membrane and of the large bile-ducts of the liver. That this is the therapeutic action of many of our popular sulphurous, alkaline, and laxative mineral waters—whose efficacy in the treatment of these affections has been well established—I have been long satisfied; and that they owe their reputation as universal remedies to the great frequency of gastro-duodenal catarrh is equally certain. "Even in catarrhal *jaundice*," says Niemeyer, "the use of the Marienbad or Karlsbad waters is followed by the most favorable and speedy results."

Catarrh of the uterine mucous membrane is of frequent occurrence, and the pathological nature of the difficulty has been a subject of most prolific discussion. I do not purpose, in this connection, to examine the various reasonings and speculations of eminent gynecologists on controverted points: I am only concerned at present with mucous membranes, and the general analogy of their morbid states.

That the uterine mucous membrane is subject to modifying circumstances in connection with periodical ovulation and menstruation, I can readily believe; and that there are intra-uterine physiological exudates at special times, which, in other localities and at other times, would be morbid, seems, theoretically at least, to be quite plausible. But, that morbid changes

of the uterine mucous membrane, from the varied circumstances of irritation, congestion, inflammation, etc., do not essentially differ from those of other mucous membranes, similarly affected, cannot be doubted. The same law of inflammation, modified by tissue, holds good; we observe the same hyperæmia, swelling, œdema, and hypertrophy, the same muco and muco-purulent secretions (mucus and pus corpuscles), the same croupous exudates, and the same detachment of epithelium.

The different stages and degrees of inflammation are, of course, here, as everywhere, important modifying circumstances. In chronic uterine catarrh, as a rule, the secretion from the cavity of the uterus is more or less purulent; while from the cervix it is usually tough, coherent, and gelatinous. When the process continues for some time, the structure of the mucous membrane is more apt to become changed than in other localities. The ciliated epithelium is swept off, and, what is somewhat peculiar, when removed it is said to be replaced by cells without cilia; thus interfering more or less with the normal function of the membrane. The same forms of ulcers also (*diffuse catarrhal*, and *follicular*) that occur in chronic inflammations of other mucous membranes are observed here.

Catarrh of the vagina, like that of the uterus, is also one of the most common of female diseases. It manifests itself by what is known as a leucorrhœal discharge (*fluor albus vaginalis*); and, according to *Kölliker*, *Scanzoni*, and others, the more opaque or yellow the secretion, the more numerous are its pavement epithelium and young cells. Direct local irritants, also, such as the discharge from a sloughing cancer, irritation from the use of a bad pessary, etc., have been known to give rise to croupous and diphtheritic inflammation of the vaginal mucous membrane, such as occurs in the mucous membrane of the respiratory track.

Catarrh of the kidneys is usually associated with the symptomatic phenomena of Bright's disease. We are indebted to Virchow for a wonderfully clear statement of the lesions of this disease in their associated relations to each other. His classification is made on a purely anatomical basis, and it tends greatly to simplify what has been rendered complex and unsatisfactory in the study of the disease.

He points out fundamental distinctions in three forms of albuminuria, and to comprehend them we must have reference to three anatomical elements of the kidney, viz., *tubules*, *interstitial connective tissue*, and *blood-vessels*. Now, either of these structures, as clearly pointed out by Virchow, may be respectively and primarily the seat of characteristic lesions; that is, we may have disease of the secreting channels, of the connective tissue, or of the blood-vessels.

The *first*, or tubal form, is a distinctly catarrhal and inflammatory affection of the mucous membrane of the uriniferous tubules. Dr. George Johnson describes this form of the disease under the name of "acute desquamative nephritis." It is, however, essentially a catarrhal process—a kind of bronchitis of the kidney, in which the microscope reveals "epithelial casts," epithelial cells, blood-corpuscles, and granular matter, such as croupous exudates, contained in every locality.

In the *second* form of the disease, the delicate net-work of the interstitial connective tissue is the seat of disease. This is essentially a *chronic* form of kidney-disease, and is described by Virchow as "cirrhosis of the kidney," and by others as "granular degeneration."

The *third* form has its point of origin in the capillary blood-vessels of the kidney, and has been most frequently described as lardaceous, amyloid, or "waxy degeneration." It is with the acute catarrhal form, however, that we are principally interested at present. This is the most frequent form, and often the initial point of disease in the other varieties described.

Lastly, it is an interesting fact that these local lesions of mucous membranes are often secondary to general constitutional conditions. This opens up too wide a field of pathological research to enter at present. One or two points of interest, however, may be noted. One is that, under circumstances of malassimilation, there are often *morbid gases* generated in the organism, and these, like the more solid products of tissue metamorphoses, are freely eliminated from mucous membranes. Prof. Tiedman's experiments on *pulmonary exhalation* have thrown much light upon this subject, and have shown that the mucous membrane of the intestines, from the great activity

which it is capable of displaying under certain states of vitiated circulation, is an excretory organ of much importance, and as such is perhaps generally underrated. Pathologists are also pointing out a very intimate connection between the assimilation of *albuminous* principles and the functions of mucous membranes—an unhealthy condition of one determining a corresponding change in the other. This is more strikingly exemplified in the *gouty* and *rheumatic* diatheses than in any other. The connection between the morbid tendencies of these affections and asthma, bronchitis, ophthalmia, renal disease, and many other affections the nature of which has not been well understood, is a remarkable pathological observation which is receiving much attention from investigators of morbid phenomena, both in Europe and America.

But it is not my purpose to write an exhaustive article on morbid states of mucous membranes. Nor do I claim to have written any thing new. I have rather sought to generalize knowledge already possessed, and to rearrange, in a more natural and suggestive order, if possible, simple elementary facts wrought out by others, hoping that, as presented, they may excite interest in, and possibly serve as a kind of key to, the study of new, and especially German, views of the pathology of mucous membranes.

That the subject is, of itself, full of interest may be inferred from the important anatomical and physiological relations of this structure in the animal economy. Its extent of surface is equalled only by the skin, and, like that structure, it "forms a defensive medium of communication between the individual being and the outer world."

When we take into consideration its great extent of surface, its importance as a channel for eliminating morbific matters from the blood, its direct influence over the important function of primary assimilation, and the frequency with which it is involved, directly or indirectly, in morbid action, it can scarcely seem like a strange fancy of a distinguished Fellow of the Royal College of London, who was in the habit of regarding his patients as so many "mucous membranes." On retiring from the profession, at a ripe old age, he remarked: "I have taken my last fee from my last mucous membrane."

Whether this be regarded as a fanciful exaggeration or not, certain it is that no structures of the body are so frequently involved in morbid action as mucous membranes; and for this reason, if for no other, their diseases should be studied with an interest and zeal pertaining to no other department of pathology.

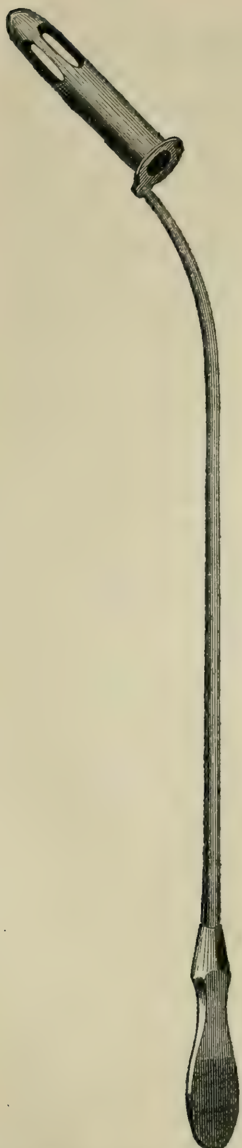
Art. IV.—*Note on Intra-uterine Medication.* By E. R. Peaslee, M. D., LL. D., Professor of Diseases of Women, etc.

Since the publication of my article on *Intra-uterine Medication*, in this Journal, for July, 1870, I have endeavored to improve the instruments therein recommended for that purpose, and am at present making use of the following improvement:

The instruments, before described, are—1. A set of five conical steel bougies, of peculiar form, for the preparatory dilatation of the canal of the cervix uteri. 2. Three fenestrated tubes of silver, or nickelized German-silver (or copper), three-eighths of an inch in diameter, and used, respectively (No. 1, two inches long), for injection into the uterine cavity (No. 2, one and three-fourth inches long), for ingestion into the same, and (No. 3, same length as No. 2) for making applications to the cervical canal. 3. A syringe, with a nozzle adapted to the tubes (Nos. 1 and 2). 4. An applicator for ingesting medicaments through tube No. 2.

The improvement I now have to submit concerns the introduction of the tubes, and their retention at will, in the cervical canal, while injection or ingestion is being performed. It is effected as follows:

The collar around the proximal extremity of each tube is made to project on one side, so as to allow a perforation in this prominent part, one line or more in diameter, into which a porte-tube (to carry the tube into the canal of the cervix) is screwed. The porte-tube is a silver-plated copper wire, one-eighth inch in diameter, and seven and a half inches long, with a handle, like that of the common steel male urethral bougie,



Peaslee's instrument for intra-uterine medication. (Half-size.)

at one extremity, and a screw to fit into the perforation in the collar of the tube, at the other end. The wire is bent in each case near the last-mentioned extremity, so as to give a proper curve ; and the whole instrument when ready for use is shown in the accompanying woodcut.

Thus armed, the tube is passed without the aid of a speculum into a previously-dilated cervical canal, with as much ease and certainty as the uterine sound. The hand of the patient (lying upon her back) then takes charge of the instrument, while the operator's hands are both free till the operation (of injection or ingestion) is completed. In case of injection, the speculum is never actually needed at all, though some operators may prefer it. In case of ingestion, the speculum may be introduced either after or before the tube is in place. I almost invariably charge the applicator with the fluid, introduce it into the tube to the level of the fenestræ, and then carry both together into the cervical canal. After the tube reaches its destination, the applicator is carried onward till it arrives in the uterine cavity, and applies to the endometrium the medicament with which it is charged.

Of course, no thread need be attached for the withdrawal of the tube, as recommended in the article alluded to.

Clinical Records from Private and Hospital Practice.

I.—*Reports of Three Cases—one of Asphyxia from Drowning, and two of Phthisis Pulmonalis—treated by the use of Oxygen Gas, at the Long Island College Hospital.* Service of Drs. Samuel G. Armor and Arnold J. Hallett. Reported by Henry N. Read, M. D., House-Surgeon.

Case I.—William Breslin, aged fifty, Ireland, laborer. Admitted to Long Island College Hospital July 27th. Patient was brought to the hospital profoundly comatose; pulse slow and feeble; lips blue; face livid; nails discolored; respiration difficult; surface cold; relaxation of sphincters, with voiding of urine and fæces; every thing indicated imperfect aëration of blood. The policeman, who brought patient to the hospital, stated that he had "fallen into the river in a fit" while standing near the edge of the dock; did not know whether the "fit" was due to the heat of the sun, which was very great at the time, or whether the man was intoxicated; he remained under water a minute or more before he was rescued; was seen immediately by a physician, and a quantity of water got out of him [?]. He was then removed to the hospital, but in a condition of such collapse that but little hope was entertained of his restoration. Diffusible stimulants with ammon. carb. were immediately administered; but, owing to the paralysis of the muscles of deglutition, little, if any thing, entered the stomach. Every effort at swallowing brought on violent spasm of the glottis and coughing, so that we were obliged to desist. Sinapisms were applied to the soles of the feet, jugs of hot water along lower extremities, and the body wrapped in warm blankets. Examination of the lungs showed fluid in bronchial tubes; gurgling sounds, like coarse *râles*, were heard over both lungs. The man's condition seeming to be desperate, there being no pulse at the wrist, it was proposed by Dr. L. D. Mason, who was present, to administer oxygen gas as a last resort. Four bagfuls were accordingly given, each containing four gallons—making sixteen gallons in all. The patient's mouth was forced and kept open with a small piece of soft pine-wood, and the mouth-piece of the tube connecting with the bag introduced; the tube was controlled by a thumb and finger. During inspiration the gas was allowed to escape, and during expiration it was shut off. The administration of the gas occupied one hour and a half, and at the end of this time slight symptoms of improvement began to show themselves; the mucous membranes became redder, and circulation better, respiration less difficult, pulse a little fuller, and the body warmer. The gas was stopped at 7 p. m., and the patient remained slowly rallying till 10 p. m., when he began to improve rapidly. In a short time reaction was completely established.

July 28th.—Patient conscious to-day, but weak and quite tremulous;

states that he has been a hard drinker for years, and has been on a "spree" for the last three or four weeks; had not taken any thing to drink, however, for a day or two previous to falling into the river; was walking along the dock, when he felt oppressed by the heat, suddenly fell, and remembers no more. Ordered Magendie's solution, ♏ xx, and perfect quiet.

July 29*th*.—Patient delirious, and quite violent; had to be tied in bed; ordered chloral hydrate, gr. xxx, to procure sleep.

July 30*th*.—Pneumonia of left lung set in last night, which rapidly involved both lungs. The patient sank rapidly, and died this morning at 11 A. M. *Post mortem* showed no lesions of brain or abdominal viscera; the lungs presented the usual appearances of the first stage of pneumonia.

CASE II.—Charles Yorgo, aged nineteen, Germany, sailor. Admitted to Long Island College Hospital June 1, 1870. Patient has had cough with expectoration of tough yellow mucus for a year, but had not given up work till within the last two months: has had slight hæmoptysis; has lost much flesh; is very much emaciated; constant cough; no appetite; night-sweats; pains in left side, etc., etc. Physical examination shows consolidation at apex of left lung, dulness on percussion, bronchial voice and whisper; no evidence of cavity. Patient gives history of hereditary tuberculosis. Was ordered cod-liver oil, with generous diet and open-air exercise. Throughout the months of June and July the patient grew worse; and at the end of the latter month spent more than half his time in bed; the oil was given regularly during this period. His pulse at this time averaged 110, his temperature 102 to 103 degrees. Commenced giving him oxygen gas, four gallons daily, on August 5th—his weight then being 114 pounds.

August 20*th*.—Improving a little; gained in flesh; appetite better; no alteration perceptible in pulse or temperature; weight 116 pounds. Cod-liver oil continued.

September 5*th*.—Improvement more noticeable than at last record; average of pulse since then 102; temperature 100½ degrees; cough decidedly better; weight 117½ pounds.

September 20*th*.—Improvement very marked; spends all his time out-of-doors; is not obliged to lie down at all during day; spirits much better; appetite good; skin looks healthier; average pulse, since last record, 90; temperature 99 degrees; weight 121 pounds—a gain of seven pounds in six weeks; oil continued.

October 1*st*.—Pulse and temperature normal for the last week; steady improvement manifest; patient eats full diet and his "extras;" oil continued.

October 6*th*.—Patient discharged to-day, at his own request, as he said he felt entirely able to ship as a sailor again. His natural functions are all normally performed; his general appearance good; pulse and temperature normal; and weight 127 pounds—a gain of 13 pounds since the commencement of the exhibition of the gas.

CASE III.—Arthur McLavy, aged twenty-two, United States, sailor.

Admitted to Long Island College Hospital June 21, 1870. Patient for thirteen months affected with cough and expectoration of thick yellow mucus; never had any hæmoptysis; has gradually lost flesh and appetite; has night-sweats, hectic, and troublesome diarrhœa. Left lung was found consolidated at apex; bronchophony, bronchial breathing, prolonged expiratory murmur present; no cavity detected. Was put on cod-liver oil; diet of milk, raw steak, etc., with open-air exercise. No family history of tuberculosis given.

Patient grew worse during this month and July; in a short time was confined to his bed entirely, and was much wasted by his exhaustive diarrhœa, copious night-sweats, and cough. Objects very much to taking the oil, as it makes him sick.

August 2d.—Commenced the exhibition of the gas to-day; four gallons given, patient taking it but slowly, owing to his enfeebled condition; oil continued—average pulse 105; temperature 102 degrees; his weight at this time 102 pounds.

August 12th.—Patient began to improve from first day of taking the gas; has better appetite; sits up more than half the day; is quite cheerful. Pulse 90; temperature 99½ degrees. At first the pulse and temperature were increased for three or four days, but then began to decline; weight 110 pounds.

August 20th.—Rapid improvement. Spends the whole day out-of-doors; takes full diet; weight 116 pounds; oil continued.

August 29th.—Discharged to-day to go back to his ship. Says he feels as well as ever. Weight 123½ pounds—a gain of 23 pounds since taking the gas.

Remarks.—The first case is of interest as showing the effects of oxygen gas as a resuscitating agent in cases of asphyxia, and is, as far as I have seen, the only reported case in which it has been used in asphyxia from drowning. But for its use in the foregoing case, there is not much probability that the patient would have rallied. It will be seen that the patient, from an apparently moribund condition, began immediately to improve on the use of the oxygen gas, until reaction was complete, and, but for the supervening pneumonia, there is no evident reason why complete recovery would not have taken place. In the two remaining cases, the first effect of the oxygen, as will be seen, was to increase the pulse and temperature "slightly," for the first three or four days; after that the pulse steadily decreased to its normal standard. The first favorable symptom manifested was an "increase of appetite;" the assimilative powers of the gas seemed very marked, promoting

digestion from the beginning; this was especially shown in the case of McLavy, whose diarrhœa almost entirely disappeared during the second week after commencing the inhalations; gain in flesh following immediately upon the improved appetite and declining diarrhœa. It is a noticeable fact, with regard to taking the cod-liver oil, that it disagreed with the patients as long as they were *confined to the house*, and produced nausea and sometimes vomiting to such an extent that it was necessary to discontinue it for several days; the oxygen, however, supplying to a certain extent fresh out-door air, its exhibition was attended with a steady decrease of the unpleasant symptoms caused by the oil, and when the patients were enabled to spend most of the day out-of-doors, in addition to taking their daily supply of the gas, the effect of the oil was most beneficial. It will be observed that the *weight* is made the criterion of improvement, the increase being steady in both cases, but much more rapid in the case of McLavy than of Yorgo; and it may be well to remark here that the former gave no family history of tuberculosis, being a genuine case of Niemeyer's "phthisis pulmonalis," whereas the latter inherited tubercles, having lost several of his immediate family with this disease. The patients very readily learn to inhale the gas after one or two trials. It is taken in a recumbent position, an ordinary respiration alternating with one of the gas. The gas is made in the laboratory of the college adjoining the hospital, under the direction of the house-staff, and at a small expense—averaging only from one and a half to two cents per gallon.

II.—*A Case of Primary Cancer of a Lymphatic Gland.* By Charles A. Hart, M. D., New York; Member of the American Medical Association; of the New York Academy of Medicine; of the New York Pathological Society, etc.

History.—Mrs. C., aged forty, of good general health, discovered about August, 1865, a small tumor, about the size of a large kernel of corn, deep in the right thigh, some five inches

above the internal condyle of the femur; this tumor, for some time after discovery, appeared to be in a state of quiescence, and gave no inconvenience. While in this condition, she was presented to a physician, in Philadelphia (the residence of the patient at that time), for his opinion. He seemed to regard it as a simple affair, and advised non-interference. At the expiration of about six months, to use the patient's own words, "a sensation like little worms crawling over the knee" began to be experienced, which was shortly followed by darting pains in the growth and the knee, but mainly in the latter location. The tumor by this time began to increase in size, and the physician who had been consulted at the time of discovery was again called upon, this time expressing the opinion of its being of malignant character, but again advised non-interference, giving some opiate lotion for the alleviation of the pain, the use of which was continued until the summer of 1866, when she placed herself under the care of a homœopathist, who evidently, judging from the opinions expressed, neither knew nor appreciated the gravity of the malady. The use of "globules" was advised and continued until January, 1867, when a surgeon, of this city, was called in consultation. He advised the removal of the tumor, and appointed January 10, 1867, for the operation, at which time the patient presented the following

Physical Conditions.—Complexion and hair dark; cheeks rosy, giving her the appearance more of a lady of twenty-five than forty years of age; body full and well nourished, without the least appearance of any thing cachectic to lead one to imagine the presence of malignant disease, of which, for two generations at least, there has been no family history; further back the patient has no knowledge. The limb, when exposed to view, was found full and symmetrical, with a tumor extending from three inches above the internal condyle of the femur to the middle third of the thigh, the most prominent part of the growth being on the inner portion of the limb; the mass was movable to a limited extent, and conveyed to the touch the stony feeling so characteristic of hard cancer.

Operation.—At 2.30 P. M., the patient having been brought under the influence of chloroform, the enucleation of the mass

was begun by an incision extending from the middle of the thigh to within two inches of the internal condyle, through the skin and subjacent tissues down to the body of the tumor. In dissecting out the lower border, the sartorius muscle was found partly overlying the mass and displaced inward and downward: it was found necessary to divide this muscle, extending the incision through the skin, joining the first cut at a right angle, which afforded more space for manipulation. During the dissection of the mass, it was found necessary to remove nearly three inches of the femoral artery, which was completely enveloped by the diseased mass. Ligatures being placed upon the cardiac and distal ends of the vessel, the wound was closed by a number of points of silver-wire sutures, a piece of lint crowded into the lower angle of the wound to facilitate drainage, the foot and leg padded to the knee with cotton, and the whole limb to the groin enveloped in a many-tailed bandage. The tumor, a few hours after removal, when I was afforded an opportunity to inspect it, measured about three and a half inches in one, and two and a half in the other diameter, and about two and a half in thickness. *The mass had evidently not been entirely removed, as quite a section had been sliced off from the deep portion of the growth and left in the wound.* Sections of the mass were examined microscopically by five or six medical gentlemen, of whom two at least are acknowledged adepts with the instrument. The opinion of all these gentlemen, with one exception, was that the growth was a simple fibroid. The exception was that the tumor was *fibro-recurrent.* None expressed the opinion nor suspected that the disease was cancerous, which the subsequent progress of the case proved it to be beyond question.

Progress of the Case.—January 10th, 8.30 P. M.—Pulse 78; suffering still from shock; slight pain in the knee; temperature of the leg considerably below the normal standard (exact difference of temperature between the two limbs, I regret to say, was not taken). Bottles of warm water were placed by the foot and leg; has taken morphia sulph., gr. $\frac{1}{4}$.

11.30 P. M.—Pulse 90, growing stronger; slight heat of skin; complains of excessive thirst; feels very nervous. Bladder emptied by catheter of about ℥vj of urine; also removed

a ring-pessary from the vagina, which had been worn about a year, without removal, in the hope of becoming pregnant. No noticeable change of temperature in the affected limb; has repeated the morphia twice, but without relief.

January 11th, 7 A. M.—Pulse 90, full and strong; had slept some; complains of numbness of leg, which felt a little warmer. Bladder again catheterized. Conditions otherwise the same.

7.30 P. M.—Pulse 100; no pain in either foot or leg; temperature of both limbs nearly the same; collateral circulation being established.

January 12th, 1 P. M.—Pulse 98; general condition good. First dressing removed; the wound looked very well, with an effort at one part at primary union; discharge from deep portion profuse and rather fetid.

12 P. M.—Pulse 112; had a troubled expression of countenance; great depression of spirits; complained of want of sensation in the limb; had fears of being permanently lame; temperature of both limbs the same.

January 13th, 1 P. M.—Pulse 106; wound looks well; discharging freely; feels better; is taking tinct. cinch., ℥ ss, every three hours. From this time every thing progressed favorably, until January 21st (seven days), when the patient had a chill, followed by fever, which lasted about three hours, for which quiniæ sulph., gr. ij, was given every two hours; the wound looked well, and was granulating nicely.

January 21st.—The chill returned about the same time, and with the same duration; quinine continued.

January 22d.—An attack of erysipelas invaded the right side of the face and head; this lasted five days, and then disappeared.

From this time to convalescence there was nothing worthy of mention, except the detachment of the ligatures, which took place February 1st from the distal, and February 4th from the cardiac, extremities. Time of retention, respectively, twenty-one and twenty-four days, at which time the wound was almost entirely healed.

This was the last I saw of the case until March 15th, when, being called to attend the lady's husband for a slight indisposi-

tion, she called my attention to a small lump in Scarpa's space, which, upon examination, afforded ground for the opinion of a recurrence of the disease. The cicatrix of the wound was exceedingly dense, and contained several indurated nodules. The leg was œdematous, pitting deeply upon pressure. *Had considerable cough, without expectoration;* general appearance *cachectic.* By the advice of friends, she had been employing the movement-cure, in hopes of rendering the limb useful. This had been forbidden by a homœopathic physician under whose care she had again placed herself, he assigning as a reason "*that the fluid in the leg would be forced into the abdomen and cause dropsy.*" The circumference of the limb at the site of the old tumor was sixteen inches; corresponding point of opposite limb seventeen and a half inches.

April 15th I was again called to the lady's husband, and, at his urgent request, I again examined his wife's limb, and found undoubted evidence of the return of the disease: the two limbs, from the development of the growth, being the same size, the gland in Scarpa's space, to which she had directed my attention a month before, being now about as large as a pigeon's egg, though the most rapid point of development was in the cicatrix. The Missisquoi-spring water, which had just come into notoriety, was being used both locally and internally, having been recommended by her former surgeon. The treatment of acetic-acid injections was also advised, but, fortunately for the patient, was not practised.

From this time until October 8th, when death resulted from hæmorrhage from the growth in the thigh, the progress of the case was extremely rapid, malignant developments having taken place in the breast, and in several encysted tumors of the scalp, which proceeded to ulceration; there were probably also cancerous developments in the chest. The circumference of the tumor of the thigh, about ten days prior to death, was twenty-seven inches; at the corresponding point of fellow, sixteen inches. The whole of the thigh was invaded by the diseased structure, which had ulcerated at five different sites. No autopsy was made.

Remarks.—The progress of this case, from the time of discovery of the tumor to the moment of death, was full of in-

terest and instruction to the clinical observer. The disease originated in a deep lymphatic gland, in a rare location, without discoverable family taint or local violence, in a person the picture of health even to the time of operation, twenty-eight months after the discovery of the tumor. The growth, prior to operation, was by no means of rapid progress; there was only a moderate amount of pain, and the growth gave but one feature of malignancy—its stony feel. It is also remarkable that the tumor, although enveloping the femoral artery, gave no evidence to the touch of the column of blood passing through it. Another point worthy of observation was the utter failure of the microscope, in the hands of experienced operators with the instrument, to distinguish its malignant nature.

The rapid return, extensive invasions, and fatal issue within a period of eight months after an incomplete operation, which beyond doubt hastened the fatal termination, are worthy of notice. In this case, to what can we assign the cause of the disease? Certainly not to a family taint, for we have no evidence of its existence—something which we cannot assume without at least a fair ground. No more can we claim local violence, as none had been received, for the patient was one who certainly would have remembered had any thing of the kind occurred. The disease, prior to the operation, was evidently entirely local, the general contamination of the economy which subsequently took place having then no existence. Had the operation been complete, there was a more than fair chance for the disease to have been indefinitely retarded or completely eradicated.

Treatment of Chorea by Ether-spray to the Spine.—Dr. John Rose (the *Lancet*, December 10th) reports a case of very severe chorea in a girl aged thirteen, anæmic, who had rheumatism but was free from heart-disease, along whose spine anæsthetic ether-spray was applied four or five minutes each time, and after fifteen sittings a complete cure followed. Two cases of chorea successfully treated in like manner were reported about a year ago in the *Lyon Médicale*.

Proceedings of Societies.

MEDICAL SOCIETY OF THE COUNTY OF NEW YORK.

Stated Meeting, January 9, 1871.

Dr. Abram Jacobi, President, in the chair.

The President announced the admission to membership of Drs. Charles S. Bull, Daniel J. C. Cook, Peter Van Buren, Frank A. Cady, August A. Malony, Thomas H. Holgate, Edward G. Janeway, Francis Delafield, John E. Blake, Henry B. Sands, Frederick Zinsser, Edwin F. Ward, Daniel H. Kitchen, Robert W. Taylor, Alexander Buchanan, S. Henry Dessau, Frederick D. Lente, and Theophilus Steele.

The report of the Committee on Intelligence was read by Dr. Castle, and that of the Committee on Meteorology by Dr. Goodwillie.

BLEPHAROPLASTY.

Dr. H. Knapp exhibited a patient upon whom he had performed a blepharoplastic operation seven months before. Reverting to the case presented at the meeting of November 7th (New York Medical Journal, vol. xii., p. 550), he stated that in the present instance the lesion had necessitated a different procedure—the more customary one of transplanting a flap from the forehead and temple. The patient was a woman who had suffered from cancer, at the outer angle of the right eye, for seven years. When she presented herself at the hospital in Twelfth Street, the disease showed several large masses at the canthus, and on the outer part of both lids. It was exulcerated and extremely offensive, so that the woman could make her person endurable only by the constant use of antiseptics. She was in the fifth month of pregnancy; but, considering the distressing character of the affection, this was held not to contraindicate immediate operation.

The cancerous tissue was removed, and replaced by a large flap from the forehead and temple, brought into position by torsion. It was necessary to have the flap large, to allow for shrinkage; a small one was apt to become so puckered as to

look more like the tip of a child's nose than like a lid. The flap swelled considerably, as is usual, the swelling being caused in part by the formation of pus beneath it, which almost always occurs. This was prevented as far as possible by drainage from below; but now, after seven months, the swelling although diminished, was still noticeable, as also a slight elevation at the point of twisting. The outer angle was also misshapen, the palpebral fissure being shorter than normal, and terminated abruptly by the edge of the flap. This might be remedied by a supplementary operation. But, though cosmetically imperfect, the new lids served their functional purpose completely. The eye could be perfectly closed, and there was no lachrymation.

FORMATION OF BONE IN THE EYE.

Dr. Knapp now took up this subject, announced for the evening, illustrating it by numerous plates, drawings, and microscopic and other specimens, and exhibiting one of the patients referred to. Omitting such parts as would be unintelligible without the figures, his remarks were substantially as follows:

The subject which I beg to introduce to your attention is partly of clinical interest, and partly of pathological. In the eye, as you know, is represented nearly every tissue of the body except bone. Bone occurs, indeed, in the eyes of birds, in the sclerotic, where it seems to be a support for the ciliary muscle, which in birds is a striped muscle. Is it possible that true bone is ever formed within the human eye, if not under physiological, then under pathological conditions? This question has been answered both in the affirmative and in the negative by good authorities. In former times very able and expert surgeons described cases of the ossification of the interior of the eye, minutely enough with regard to their microscopic appearance; and, later, Mackenzie and others published cases perfectly faithful to nature. But, there came about a reaction, in which the tendency prevailed to discredit these accounts, and to regard all the so-called ossifications in the eyeball as merely calcifications, lacking the corpuscles and nutrient canals characteristic of true bone. The literature of

the subject is rather scanty, but an excellent paper was published in *Graefe's Archives*, in 1860, by Dr. Pagenstecher, who made his investigations in the laboratory, and under the auspices of Prof. Heinrich Müller, who has done so much for ophthalmic pathology. This book is based upon the examination of eight cases; it also collates the labors of previous investigators; and it establishes the occurrence of true bone in the eye beyond a doubt. In one of the cases the origin of the bone is clearly traced to the capillary layer of the choroid.

The fact of the occasional formation of bone in the eye being established, many other questions remain to be elucidated, some of which I may point out: 1. Which of the membranes, and which layer of each, are the starting-points of ossification? 2. What are the nature, the cause, and the extent, of the ossific process? 3. What changes are produced by it in the membranes not undergoing ossification? 4. Can the affection be diagnosticated, and how? 5. What is its prognosis, and what its treatment? The answers to these questions must rest both upon clinical observation and upon pathological research. I may be allowed briefly to relate my own experience.

The first case which came under my notice was that of a girl, seventeen years of age, of scrofulous habit, subject to ophthalmia from earliest childhood. The left eye was exceedingly weak, and she had lost the sight of it three years before I saw her. At that time the right was also suffering, as it had often done, from sympathetic inflammation. There was great photophobia, and the visual power was failing, being found on examination to be only one-fourth the normal standard. The posterior part of the left globe was as hard as wood to the touch, the anterior third presenting the normal resistance. Since it was evident that the seeing eye was suffering from sympathy with the blind one, I complied with the patient's request to remove the latter. It disclosed a hard shell reaching from the optic entrance to the ora serrata. This shell had replaced the inner layers of the choroid. It was covered internally by a layer of connective tissue; and from the ora serrata, where the hard shell terminated, this connective-tissue layer was continued into a diaphragm which stretched across

the vitreous-chamber at a short distance behind the lens. The retina was completely detached from the choroid, being connected only with the optic nerve behind, and the ciliary body in front, so that it floated in the vitreous as a funnel-shaped membrane. The hard shell proved, under the microscope, to be true bone.

This case set me thinking of the origin of ossification. I considered, as has been urged by others, that ossification is an active process, requiring a large supply of nutritive material, while calcification is a process of regressive metamorphosis, occurring in tissues which have ceased to grow, and are undergoing atrophy or degeneration. Ossification, therefore, ought to start from that part of the eye where there is an abundant nutritive supply, and this condition is found only in the capillary layer of the choroid. The external layer of the choroid is extremely rich in blood-vessels, it is true, but they are not destined to its nutrition; it is certainly no better nourished than any other tissue, having no peculiar function. It is the number of its capillary vessels which determines the dignity of an organ. Now, it is a remarkable fact, brought out by the researches of Dr. Leber, that the capillary vessels of the choroid cease at the ora serrata, at the commencement of the pars plana corporis ciliaris. Ossification, in this case, extended just to this boundary; and just here the false membrane stretched across the vitreous-chamber.

A physiological principle seemed here to be indicated by pathology; but a single case would prove nothing, it must be corroborated by others. Soon after this, my friend Dr. Althof told me that he had observed a case in which the osseous plate lay in the anterior portion of the eye, the posterior part being entirely free from bony formation—a case just the reverse of my own. He was kind enough to lend me the specimen. Unfortunately, it had passed through many hands, and of the posterior portion nothing remained but the sclerotic; the anterior portion, however, was well preserved. There was an ossified transverse septum extending across the globe behind the lens, from the edge of the ora serrata, leaving the lens and the parts in front of it entirely free from bone. The choroid, I was told, was also free from it. In this case.

then, the ossification would seem to have started from the anterior edge of the chorio-capillaris. There was, doubtless, first inflammation of this portion of the capillary layer, resulting in plastic exudation, which, as it increased, had perforated the pigmentary layer and the hyaloid membrane, and streamed into the vitreous as a false membrane. This false membrane then became the site of true bony deposit, to which connective tissue is always liable when it is sufficiently nourished. The formation of bone in this case is, therefore, seen to be connected with the chorio-capillaries, and to constitute no exception to the physiological law above suggested.

Let us follow, for a moment, this process of bone-formation. There is inflammation of the capillary layer of the choroid, with plastic exudation. What does this mean? It means infiltration of the mother-tissue with lymphoid cells, that is, with white blood-corpuscles, together with transudation of blood-serum. Then their metamorphosis begins. The white blood-corpuscle, from being a wandering cell, is becoming a fixed cell. It soon acquires a larger protoplasmatic body, and stretches out offsets, which speedily communicate with the offsets of its neighbor-cells, that have ceased from their wanderings to found a colony here. Thus there is formed a connective tissue of cells having between them protoplasm and nothing else. Only later, when the new tissue has become older, you find its intercellular substance exhibiting the fibrous character. By-and-by this intercellular substance gets impregnated with chalk, at first only slightly, afterward more and more densely; and the denser this chalky infiltration, the more fixed do the included cells (white blood-corpuscles, connective-tissue corpuscles, soon to be bone-corpuscles) become, until the tissue is entirely stiff, and their further movement impossible. In the specimen here shown, you see the chalky intercellular substance forming a firm trabecular net-work, holding in its meshes the cells, which are not at all solidified. This kind of tissue, intermediate between connective-tissue and fully-developed bone, is called by Virchow *osteoid tissue.*

Dr. Althof kindly furnished me also two other specimens, but their condition did not admit of a complete examination; they showed only the osseous shell in the posterior

part of the eye, evidently formed from the choroid. This shell was quite thick—in one of the specimens two and a half lines—and exhibited at the optic disk a round hole, through which the retina passed to join the optic nerve.

For the opportunity of examining two other specimens, both well preserved, I am indebted to Dr. Reuling, of Baltimore. One of them was important, as showing the ossific process in its beginning. A thin osseous, or, rather, osteoid, plate was forming in the connective tissue, which had replaced the capillary layer of the choroid around the optic disk. Its inner surface was lined with connective tissue, while on its outer surface could be seen vessels from the outer layer of the choroid entering its nutrient canals. The anterior portion of this eye was quite remarkable. A section in the vertical meridian showed bone lying immediately behind the iris, beside the lens, giving the impression, at first, that the ossification must have started from the iris or the ciliary body. There would have been nothing improbable in this, for both the iris and the ciliary body are highly vascular; and we often see formed on the surface of the iris false membranes of connective tissue, liable, of course, to ossification. Closer examination showed, however, that the bone had started from the anterior part of the chorio-capillaris, and had been drawn forward to its present position only by the contraction of a cicatrix, which had resulted from traumatic injury, and included all the structures in the anterior portion of the globe. This was clearly proved by the fact that the layer of choroidal pigment-cells was found intact on the anterior surface of the bony plate. This case affords an explanation of one described by Pagenstecher, as a curiosity which he could not understand. In his case the ossification had advanced somewhat further forward, and toward the optic axis, coming in contact with the ciliary processes; and the plate of bone showed, impressed upon its outer and anterior surface, a cast of these, forming a complete corona ciliaris. This impression of the ciliary processes must evidently have been made upon the bone while in the soft formative condition; and it clearly shows that the ciliary processes were not themselves centres of the ossification. This first specimen of Dr. Reuling's, like the case first related, had

connected with the bony plate, in the anterior part of the eye, a diaphragm of connective tissue, passing across the vitreous behind the lens, to which it was closely attached by the cicatrix above mentioned.

Dr. Reuling's second specimen brought out no additional points, but served to confirm those previously observed. It was also one of traumatic injury, and the foreign body—a piece of percussion-cap—was found encapsuled and suspended in the vitreous immediately behind the posterior pole of the lens. This is quite unusual; heavy foreign bodies entering the vitreous chamber commonly sink to the bottom of the globe.

The last case I have examined is that of the woman who sits before you. Nineteen years ago she had in the left eye what was probably an attack of acute iritis, which left the eye weak and its vision impaired. Seven years later both eyes were attacked, the left becoming blind, the right recovering. Since then there have been several accessions of inflammation in the blind eye, with which the right would sympathize. Some four months ago in one of these attacks the right eye suffered severely, and she came to the Ophthalmic Institute for relief. It showed the symptoms of grave irido-choroiditis; antiphlogistic treatment proved ineffectual, and enucleation of the left eye was performed to remove the cause of the probably sympathetic inflammation in the other. Though the operation was done without accident, it has proved of less service than I had hoped, for the right eye has still continued subject to frequent exacerbations of the inflammation.

This eye—which the patient will allow you to examine—presents a typical example of irido-choroiditis. Sympathetic inflammation manifests itself under three forms: 1. Ordinary plastic iritis, which is easy to cure; when treated antiphlogistically, after removal of the other eye, it seldom relapses. 2. Serous iritis, in which a highly-plastic exudation is deposited upon the posterior surface of the cornea as well as upon the posterior wall of the anterior chamber. The affection is very chronic, and very prone to relapse and to bring on complications that may destroy vision—false membranes in the vitreous, cataract, shrinking of the globe, etc. 3. The

form you see here—irido-choroiditis. You observe that the pupillary edge of the iris is completely bound down to the lens-capsule. The lens is somewhat opaque, and so is the vitreous body. This opacity of the vitreous, and the impairment of vision—greater than could be explained by the iritis alone—indicate inflammation of the ciliary body and the choroid.

The left eye of this patient, before enucleation, presented the characteristic sign which makes it possible to diagnosticate ossification of the capillary layer of the choroid in the living subject—a wooden hardness of the posterior two-thirds of the globe, ceasing abruptly about two lines behind the margin of the cornea. Examining the eye after its removal, I found the evidences of active inflammation in the ciliary body and the iris, which accounted for the sympathetic inflammation of the other eye. Both these structures were thickened by a layer of lymphoid cells and of connective tissue already produced by their metamorphosis. The bony formation presented essentially the same conditions as those before described—an osseous shell occupying the seat of the inner layer of the choroid, covered within by fibrous tissue, and terminating at the ora serrata, whence a diaphragm of false membrane, beginning to ossify at its periphery, stretched across the vitreous.

These are all the specimens which have come under my observation, and, reviewing them, we come to the following conclusions:

The *origin of true bone* in the eye may always be traced to plastic inflammation of the capillary layer of the choroid. I find nothing in the literature to contradict this, though most of the cases are so ill reported as not to give the origin—sometimes not even the extent—of the ossification. Calcification may occur, and has been observed, in every tissue of the eye—it is found in several of the specimens we have examined to-night—but ossification only in connection with the very vascular chorio-capillaris. In the retina the blood-vessels are scanty; in the lens there are none at all. Yet nearly every text-book speaks of osseous cataract. It may be correct, but is in all probability erroneous. I have seen in old cataracts an unmistakable layer of fibrous connective tissue inside the lens-capsule, and inside this layer a distinct calcareous de-

posit. But never have I found in this situation, nor has any one described or figured, a tissue having bone-corpuscles, much less Haversian canals. The cases where ossification has been supposed to originate in the vitreous are probably to be explained by the extension into the vitreous of false membranes of connective tissue from the choroid, as in the cases we have seen, and their subsequent metamorphosis into bone. Of Pagenstecher's case of suspected ossification of the ciliary body we have given a rational solution.

The *nature of the ossific process* in the eye is the same as that in connective tissue generally, the same as in the formation of bone from periosteum. In the preparation under this microscope you can trace all the successive stages in the change of connective tissue into bone. The cells (white blood-corpuscles) and intercellular substance are poured out, the former in some places densely crowded; and then, with a clear line of demarcation, the infiltration with chalk begins. In some portions, the connective-tissue corpuscles are still preserved round, or nearly so, having few offsets; but the more the chalky infiltration advances, the more numerous the offsets become, communicating with each other to form the canaliculi. The round, movable, lymphoid cell, putting forth its processes and retracting them again, becomes first the jagged cell of the osteoid tissue, and, finally, the stellate cell—the real bone-corpuscle.

What *changes* are produced by this process *in those parts* of the eye *not undergoing ossification?* The *retina* only exceptionally remains adherent to the bony shell—there is but one case on record. Commonly it is contracted into a funnel-shape, having its apex at its attachment to the optic nerve, and its base at that to the ciliary body. Of course, it has no longer any function, and it is usually more or less degenerated into connective tissue. The *lens* becomes retracted and cataractous—matters of no practical moment, since the eye is already blind. The *iris* and *ciliary body* may remain intact for a great while. I have seen cases showing the signs of ossification which had probably existed for thirty or forty years—where the globe had even assumed a square shape from the traction of the recti muscles—yet no new irritation, no iritis

or cyclitis, had been set up in the affected eye or in its fellow. The *outer layer of the choroid* and the *lamina fusca* are, like the iris and ciliary body, often quite unaffected. In these parts run the ciliary nerves, while there are none in the chorio-capillaris or the parts traversed by the transverse septum of bone (or connective tissue). These nerves, therefore, escape irritation, and so the other eye does not suffer, except when we have cyclitis or iritis. Unfortunately, these complications are not very rare; indeed, chronic iritis with choroiditis (now called irido-choroiditis) is the disease, perhaps, most frequently leading to ossification. If the original inflammation is not extinguished, we are apt to get, in some of its exacerbations, pressure on the ciliary nerves, and consequent sympathetic ophthalmia of the other eye, though many attacks may go by without producing it.

The *prognosis* is sufficiently indicated by the considerations just now adduced. There is no hope of preserving or restoring the sight of the eye undergoing ossification. There is always a chance of a fresh iritis or cyclitis becoming lighted up in it, and of this producing trouble in the sound eye.

Antiphlogistic *treatment* of the bad eye for the sake of its fellow is, therefore, indicated whenever inflammation occurs. When both eyes are inflamed, both must be treated; and, if the sympathetic ophthalmia assumes a grave aspect, prompt extirpation of the ossified and useless eye is the proper measure. It is to be borne in mind, however, with regard to this last procedure, that it should not be resorted to until the sympathetic inflammation actually appears; for we have seen that in many cases ossification may exist for years without the occurrence of any such complication.

Dr. Jacobi inquired what was the relative frequency of the occurrence of ossification and of calcification in the eye.

Dr. Knapp replied that ossification was very rare, and would appear to be confined to one layer of one membrane; while calcification was a very common incident of nearly all chronic diseases of the eye, and might affect any of its structures. Intra-ocular tumors might become calcified, as, for example, glioma in young children. Sometimes the chalk would

be deposited in small granules; now it would infiltrate single cells, now the intercellular substance; and the original structure of the tissue would often be well preserved, as might be seen on removing the chalk by acids. Not rarely irregular masses of chalk would be found immediately opposed to true osseous plates.

Dr. Jacobi said this relative frequency agreed with what was found in other parts of the body. It would be worth while to investigate the cause of the limitation of true bony formation in the eye to the part so clearly defined by Dr. Knapp. Why should not inflammation of other parts lead to ossification? Probably the reason should be sought in some peculiarity of the original structure.

Dr. Knapp thought the cause he had assigned sufficient—the high vascularity of the chorio-capillaris. Other parts could not afford to nourish a new formation making such large demands as young growing bone. But the capillary plexus of the inner choroidal layer—designed to nourish not only the choroid itself, but also the adjacent structures, and to secrete the humors—supplied the requisite nutritive material in abundance. Calcification, a phenomenon of degeneration and involution almost everywhere, made no such requisition for supplies, and so could take place in any of the structures. The same principle found application in the healing of fractures, etc., and a knowledge of the vascular distribution might sometimes determine our course in such cases.

Dr. Jacobi considered that calcareous deposit was not always an index of a retrograde process; it was rather the result of slow or stagnating circulation, from whatever cause. When the blood-current became slower, its carbonic acid had an opportunity to escape through the vascular walls, and the carbonate of lime it had held in solution was precipitated as a chalky deposit. In the placenta, where the circulation was always very slow, we found calcareous deposits oftener than anywhere else. In rachitical bones the mass of new-formed connective tissue between the shaft and the epiphysis would both elongate and compress the blood-vessels, impeding the circulation, and so causing the deposition of lime. It would seem as if the same thing must take place in plastic inflamma-

tion of the choroid, elongation and compression of vessels, slowing of circulation, escape of carbonic acid, and deposit of lime.

Dr. Knapp, acknowledging the justness of these considerations, was reminded by them that, in calcified tumors of the choroid and retina, he had always found the chalk-deposit in the immediate vicinity of the choroid.

A TIGHT-FITTING PISTON.

Dr. A. H. Smith presented a hypodermic syringe, the piston-rod of which was hollow, carrying a screw for tightening the leather packing by simply turning the handle, without removing the piston from the cylinder. He explained, also, modifications of the same principle, adapting it to larger syringes, pumps, steam-cylinders, etc.; and stated that, in view of this wide applicability of the invention—the professional applications constituting but a small fraction of the whole—he had secured a patent for it.

On motion of Dr. E. Eliot, it was voted that, to accommodate those attending the approaching meeting of the State Society, the next regular meeting of the County Society be held on the *second* Monday of February (13th).

The Society adjourned.

Sir William Fergusson has proposed to form a national collection of surgical instruments, to be placed in the Museum of the College of Surgeons, London, to illustrate as far as possible the progress of surgical art in Great Britain, and the improvements made from time to time in surgical appliances and instruments.

Dr. Francis E. Anstie has been appointed to the chair of Medicine in the Westminster Hospital Medical School, vacated by the resignation of Dr. Basham, after a service of twenty-two years.

Prof. S. Skoda, of Vienna, has resigned his chair of Clinical Medicine, on account of failing health. He is sixty-five years of age.

Reports on the Progress of Medicine.

OPHTHALMOLOGY FOR 1870.

By Henry D. Noyes, M. D., New York.

ORBIT.

1.—*Anatomy of the Orbital Veins.* [Archiv f. Anatomie und Physiologie, s. 154, Taf. v.] Dr. Seseman.

The superior and inferior ophthalmic veins do not empty the largest quantity of their blood into the sinus cavernosus, but into the facial veins. Thrombosis of the sinus, therefore, cannot seriously obstruct the orbital veins. For a similar reason, so numerous are the anastomoses of the v. centralis retinæ with the v. ophthalmica superior that thrombosis of the sinus, or its compression by tumors, cannot be a cause of retinitis, as has been asserted—superior and inferior ophthalmic veins freely anastomose with each other. When symptoms of obstruction occur, viz., œdema of the lids, fulness of the frontal veins, exophthalmus, impaired sight, they are to be explained not by simple thrombosis of the sinus cavernosus, but by the presence of thrombi at the same time in the ophthalmic or facial veins.

2.—*Ectropium; Exophthalmus; Extirpation; Plastic Operation.* By Henry D. Noyes, M. D., New York. [Trans. Am. Ophth. Soc., 1870, pp. 129–133, with 3 woodcuts.]

A remarkable case of deformity, the consequence of necrosis of the margin of the orbit. The patient was sixteen years old, and the primary disease occurred in infancy. While removal of the eye was inevitable, the condition of the orbit would not permit the substitution of an artificial eye. Hence, besides enucleation, the conjunctiva was dissected away, the retracted state of the lids corrected, and finally flaps slidden in from the adjacent skin to completely cover in the front of the orbit. All these steps were accomplished at one operation, and the patient, notwithstanding an attack of erysipelas, did well.

Although she still was afflicted with a deformity, the operation relieved her from much distress, and restored to her the comfortable use of the other eye, which had been very troublesome. Woodcuts show the state of parts before and after the operation.

3.—*On Certain Peculiarities in the Construction of the Orbit.* By Harrison Allen, M. D., Philadelphia. [American Journal of Medical Sciences, January 7, 1870, pp. 116–119.]

Among several interesting varieties described, the modifications which may occur in the lachrymal bone may be quoted. It may be reduced to a rudiment; it may be absent, a small irregular space indicating the position it should occupy; it may be absent, and there be no interspace; there may be an accessory lachrymal bone found lying between the lachrymal proper and the nasal process of the superior maxilla; a small ossicle may be seen at the anterior-inferior region of inner wall of orbit, wedged in between the nasal process of superior maxillary, lachrymal, and nasal bones.

4.—*Orbital Aneurismal Disease, and Protrusion of the Eyeball from Venous Obstruction.* By D. T. G. MORTON, of Philadelphia. [Am. Jour. Med. Sciences, July, 1870, pp. 36–46.]

Case of Traumatic Aneurism of Orbit treated by Compression. By Dr. G. C. Harlan, of Philadelphia. [Am. Jour. of Med. Sci., July, 1870, pp. 46–48.]

Dr. Morton narrates four new cases of the disease, one of them treated by ligation of the common carotid, and successfully. Dr. Harlan's case was treated by compression for eight hours without cessation, and afterward for four to six hours daily for five weeks. The veratrum viride was also administered until its effect on the pulse was obtained and kept up. Patient's condition was so much improved, that he was able to resume his work as brakeman on a railroad, but after a time the disease returned. He expected to return to the hospital for ligature of the carotid.

5.—*Aneurism of the Orbit; Exophthalmus.* By Dr. SCHIESS-GEMUSEUS. [Klin. Monats. für Augenheilkunde, February, 1870, pp. 56–64.]

A woman, aged forty, was kicked in the face by a horse; a year or more afterward an orbital aneurism formed. In treatment two injections of ergotin in the lid were tried, without good effect. Intermittent digital compression kept up nine days in May, and, after a week, seven days in June. Then the common carotid was tied. Secondary hæmorrhage occurred three times. Pulsation not abolished, and after two weeks it was evident the aneurism was not cured. Five months afterward the enlarged frontal artery was sought to be tied, but was so surrounded by small arteries that only three of these could be seized. The sac was much reduced in size, and two months afterward was exceedingly small, although showing light pulsation. The whole left side of the face was abnormally vascular, and the question was raised whether this was a true aneurism or a cyrsoid, but the former opinion was adhered to. The variety of treatment, and its comparative inefficiency, are noteworthy.

MUSCLES.

6.—*The Operation for Strabismus.* By S. J. HALBERTSMA. Inaugural Dissertation. Utrecht, 1869. [Zehender Monatsblätter, January, 1870, p. 29.]

This paper sets forth the methods of operating done by Dr. Snellen, at Donder's Clinique, in Utrecht. For extreme degrees of deformity Liebreich's mode is adopted. He makes one remark, that, if the capsule of Tenon be incised too near the bulb, bleeding may be so free as to cause serious embarrassment, which may be avoided by keeping nearer to the inner surface of the conjunctiva. The usual mode of operating is with patient lying on the back, chloroform not given, the conjunctiva opened by a wound in the horizontal meridian, pretty long; the wound separated and the conjunctiva dissected from subjacent parts both above and below by probe-pointed scissors. The caruncle also is raised. The tendon is next seized with the forceps and securely grasped; one blade of the scissors is pushed beneath it closely as possible to the sclera, and the insertion clipped. Incisions may be made as needful above and below, and the blunt hook used to ascertain whether any fibres remain undivided. On behalf of this method it is claimed that it is easier, that it is less painful, that thrombi do not so readily occur, and the operation can be exactly regulated. Sutures may or may not be employed.

When operating for insufficiency, the tendon is exposed in the same manner, but for a greater distance backward. When cut, a little bit is left

attached to the sclera, and two sutures are put in so as to bring forward the muscle, in the following manner: The first begins at the upper and inner edge of the conjunctival wound, then through the stump of the tendon, then deep as the case may require into the muscle, which is dragged forward, and finally into the conjunctiva, and tied. The other suture takes a similar course for the lower border of the conjunctival wound, and the effect of both is to drag the muscle forward. The conjunctival wound may be united if needful by a suture from above downward. This operation has special application for insufficiency with paresis of the antagonist.

7.—*A Case of Strabismus Concomitans Convergens Intermittens.* By Dr. W. Wagner. [Klin. Monats. f. Aug., April, 1870.]

A child, six years old, with convergence of 3½‴ which, for two months, appeared every four or five days, and lasted twenty-four hours; these recurred regularly every other day for two months. During six months more the case was observed and antiperiodics given in vain. There was no error of refraction or accommodation. A very careful and restricted setting back of one internus cured the malady—which was regarded as coming from disturbed innervation.

8.—*A Case of Monolateral Nystagmus, in which the Oscillations are vertical.* By Dr. Zehender. [Klin. Monats. f. Aug., April, 1870.]

The affected eye was perfectly blind, except at the periphery of the field, and the nerve showed signs of atrophy; the other eye normal; patient a girl nine years old.

9.—*A Contribution to the Subject of Strabismus.* By Dr. C. R. Agnew, N. Y. [Trans. Am. Oph. Soc., 1870, p. 148.]

An advancement of the inferior rectus, to correct deformity produced by a faulty operation on account of converging squint.

EYELIDS.

10.—*Clonic Spasm of the Eyelids; Section of the Supra-orbital Nerves.* By Dr. J. Talkow, of Tiflis. [Klin. Monats. f. Aug., May, 1870, pp. 129–145.]

The spasms affected both eyes, had lasted seven years, and wrinkled the eyelids in deep furrows; the cause could not be assigned. A surgeon had excised a strip of skin from the lids, with the production of harm rather than good. Injections of morphia and atropine in the temple were fruitless. Extensive splitting of the outer canthus to the temple was of temporary benefit. On the other eye subcutaneous myotomy was of no avail.

Several similar cases are quoted, and the treatment by neurotomy commented upon as performed by Graefe and Wecker, and recommended by Romberg. The left supra-orbital nerve was cut by subcutaneous section under the influence of local anæsthesia. Immediately, spite of a thrombus, the size of a pigeon's egg, the patient could open his eye. Three weeks after, he had neuralgia in this region. Electrization was proposed, but patient refused, and left the hospital. After nearly a year the patient had acute rheumatism, which might be considered the cause of his trouble. The side where neurotomy had been done was insensible and free from spasm, but the other eye suffered as before.

11—*A Case of Xanthelasma Palpebrarum.* By Dr. Arthur Geissler. [Klin. Monats. f. Aug., February, 1870, p. 64.]

A discoloration of the skin of the lids, also called vitiligoidea, in a wom-

an aged forty-four, which was in the form of a horseshoe, and of a straw-yellow color.

12.—*Xanthelasma Palpebrarum.* By Mr. JONATHAN HUTCHINSON. [Ophthalmic Hospital Reports, vol. iv., pp. 265, 275, 282.] Three cases are given—the patients being forty-five, fifty-seven, and fifty-eight years old.

13.—*Favus on the Lids and in the Canaliculi.* By Dr. NARKIEWICZ-JODKO. [Gazeta Lekarrka, Warsaw, March 14, 1869.] Two cases are quoted in Zehender.

14.—*Three Cases of Herpes Zoster Frontalis.* By Dr. B. J. JEFFRIES, Boston. [Trans. Am. Oph. Soc., 1870, pp. 100–103.]

15.—*A Case of Xanthelasma Palpebrarum.* By Dr. J. HIRSCHBERG, of Berlin. [Klin. Monats. für Aug., May, 1870, p. 167.]

CONJUNCTIVA.

16.—*The Use of Acetic Acid in Affections of the Conjunctiva and Cornea.* By Dr. B. A. POPE, of New Orleans. [Archives of Ophthal. and Otol., vol. i., part ii., pp. 446–458.]

Dr. Pope employed acetic acid of sp. gr. 1,041 (No. 8), which he says is a mild escharotic when of this strength. With it he treated a rebellious case of warty degeneration of the palpebral conjunctiva for which ordinary caustics and excision had very slowly effected a cure, but could not preserve against relapse. The second attack was cured by the acid in less time, and finally. It was applied by a very fine camel's-hair brush once every day, and only to the spots to be destroyed. Other cases thus treated were the relaxed and hypertrophied state of the conjunctiva in the *cul-de-sac* following chronic conjunctivitis—some cases of trachoma in the stage of development, as an occasional application, and strictly confined to the granulations—an inflamed pinguecula which the patient refused to have excised—hypertrophy of the caruncle and semilunar fold in pterygium—in two cases of calcareous degeneration of the epithelial layer of the cornea sometimes combined with excision—in a case of dense opacity of the cornea, the result of partial sloughing after ophthalmia neonatorum. When put upon the cornea the acid will cause an ulcer after two or three applications, and care must be taken not to let this process make unmanageable progress—with such vigilance the new tissue which repairs the ulcer was found to have a gratifying degree of transparency. It needs to be repeated a number of times to attain the best result, and is a remedy which only a skilful hand should apply, and an experienced eye watch, but doubtless it may do good service in some intractable cases, as enumerated.

17.—*A Peculiar Case of Conjunctival and Corneal Inflammation.* By Dr. D. B. ST. JOHN ROOSA, New York. [Transactions American Ophthalm. Society, 1870, pp. 88–91.]

An inflammation in some respects like herpes corneæ, accompanied by partial ptosis, which recurred every week for nine months, seldom failing to appear at its expected time. Its severe pain lasted a few hours, and its duration was about two days. Local and general treatment of little avail—no important change of tissue—the other eye perfectly well.

18.—*Canthoplasty in the Treatment of Diphtheritic Conjunctivitis.* By Dr. C. M. ALLIN, New York. [Trans. Am. Oph. Soc., 1870, pp. 91–93.]

Pressure of the swollen lids relieved more effectually by stitching the

conjunctiva to the edges of the wound at the outer angle, than by merely slitting without introducing the stitches. The ordinary treatment by iced compresses, and nitrate of silver applied in addition.

CORNEA.

19.—*Quinine as a Local Remedy in Certain Forms of Conjunctival and Corneal Disease.* By Dr. J. S. Prout, Brooklyn. [Trans. Am. Oph. Soc., 1870, pp. 114–117.]

Two cases of trachoma with pannus are reported as having been treated by application of dry quinine, and of quinine in solution, to the lids, with beneficial results, which appear to be owing to the special effects of the remedy. Similar good results are narrated from daily application of solution of muriate of quinia ℈ij and ℥j in a case of traumatic and spreading ulceration of the cornea. At the meeting of the Ophthalmological Society in Heidelberg in 1869, Prof. Nagel brought this subject forward, and there is sufficient evidence in behalf of the efficacy of this treatment to induce its being thoroughly tried. We would suggest its special fitness in ulceration and suppuration of the cornea in addition to the usual remedies.

20.—*The Nerves of the Conjunctiva and Sclera.* By Friedich Helferich. [Würzberg, pp. 35, 1870.]

21.—*Ulcus Corneæ serpens and its Treatment.* By Dr. Saemisch. [Bonn, 1870.]

Under the above title is indicated an ulcerative keratitis whose tendency is to spread in extent and in depth, which occupies the central part of the cornea, which in about sixty per cent. of the cases is accompanied by hypopion. Frequently there is severe ciliary neuralgia, sometimes almost none; there is always coincident iritis. This disease often occurs in children, is often traumatic. The usual treatment, by atropine, warm fomentations, paracentesis and iridectomy, saves a certain number of such eyes; but Dr. Saemisch announces a much more successful plan, which he has adopted in thirty-five cases. He has cured, he says, thirty-four out of the thirty-five. If this be not too warm a statement of results, we certainly have reason to accept the proposed method. It consists in making an incision across and through the ulcer from one side to the other, and keeping the wound open by repeatedly separating its lips until cicatrization begins. The wound begins and ends in healthy cornea, and is best made by transfixion with Graefe's knife. The wound is at first reopened twice daily, afterward once daily suffices, and Weber's probe-pointed lachrymal knife is the instrument Dr. S. uses. The instillation of atropia is kept up, and the eye protected. The cut generally relieves the pain at once, and the ordinary dangers of prolapse of iris and staphyloma are completely avoided, while the risks of mischief in the operation are easily guarded against by a skilful surgeon.

22.—*The Regeneration of the Epithelium of the Cornea.* By Dr. O. T. Wadsworth, Boston. [Boston Medical and Surgical Journal, vol. vi., No. viii.]

23.—*Versuche über Hornhaut-Entzündung.* By W. F. Norris, of Philadelphia, and S. Stricker, Wien, 1869.

24.—*Ueber die Grundsubstanz und die Zellen der Hornhaut des Auges.* By Drs. Schweiger and Seidel. [Bericht der Mathemat.-Phys. Classe der Konigl.-Sacs. Gesellschaft der Wissenschaften, 1869, pp. 305–359. Monatsblät. f. Augen., June, 1870.]

25.—*Melanoma der Cornea.* By Dr. Langhaus. [Virch. Archiv, Bd. 49, p. 117.]

26.—*Ueber ein Cancroid der Cornea und Sclera, ein Beitrag zur Entwickelungs-geschichte der Carcinoma.* By Dr. A. CLASSEN. [Virch. Archiv, Bd. 50, Heft. i.]

IRIS AND CHOROID.

27.—*Granulation Tumors of the Iris.* By Dr. J. HIRSCHBERG, of Berlin, and Dr. STEINHEIM, of Bielefeld. [Archives of Ophthal. and Otol., vol. i., part ii., pp. 647–658.]

The case on which this paper is built is that of a peasant, aged twenty-one, who was wounded in the left eye by a splinter of wood. Some months after a growth appeared on the lower half of the iris; it was yellowish or flesh-colored, and slightly nodular, and filled the lower half of the anterior chamber; pupil adherent, fundus visible, sight good, field not abridged. A year later the tumor had invaded the corresponding part of the cornea, attained the size of a small hazel-nut, and overlapped the sclera. A little of the iris visible above, pupil covered by exudation. At the section, the lens was missing, and the tumor sprang from the ciliary body and iris. The microscope revealed "a vascular fibrous, parvi-cellular mass. The stroma of parallel fibres is richly developed. The cells are roundish and irregular (shrivelled by alcohol), occasionally short spindle-shaped, with distinct nuclei, a little larger than red blood-corpuscles; here and there some with many nuclei (myeloplaxes), but no giant-cells."

The tumor pronounced a granuloma, and without danger of recurrence. "The relatively youthful age of the patient, the yellow or reddish, decidedly not melanotic color, the uneven surface, and the microscopic vascularity, the very slow increase of the growth which projects quite gradually from the iris tissue, might argue for the existence of granuloma, while, in an indubitable case of sarcoma of the iris, the neoplasm presented a smooth, uniformly bluish-black surface."

28.—*Choroiditis after Relapsing Fever.* By Dr. J. ESTLANDER. [Archiv f. Opthalmol., B. xv., ii., pp. 108–143. 1869.]

Two epidemics of relapsing fever occurred in Finland, between 1865 and 1869, and among other complications it was not rare to have disease of the interior parts of the eye. Dr. E. had seen twenty-eight cases. They appeared mostly between the second and fourth week after convalescence, sometimes two to five months afterward, seldom during the acute progress of the malady. Vision becomes clouded, but outwardly there is nothing abnormal, while by the ophthalmoscope the vitreous is seen to be turbid. The opacity, which is at first diffused, condenses slowly into small gray specks, like mucous floating in water, and with black irregular masses. At first they float about constantly, but at a later period they settle by gravitation, and only float up when the eye is moved. This condition lasts about four weeks, and perfect recovery may ensue. But more often iritis takes place after some days or weeks, announcing itself by pain, hyperæmia, contracted pupil, posterior synechiæ, exudation, hypopyum and chemosis. There is not much photophobia; tension is more likely to be abated than increased. If the exudation do not exceed posterior synechia, entire recovery is possible; but after hypopyum the pupil is apt to remain occluded, and even suppuration of the cornea, followed by atrophy of the globe, may ensue.

One case of the last sort was microscopically examined, and the lesions found to originate in the ciliary body, which was converted into a brawny

mass, and pervaded by pus-cells. The vitreous opacities were composed of cells with processes, of pus cells, of fine fibres and detritus. In the lenticular fossa the hyaline membrane was covered with exudation. Only the anterior part of the retina contained pus. The choroid was free from morbid changes, but the iris was in a condition similar to the ciliary body.

Decided antiphlogistic treatment was soon found to be improper, and atropine alone was most effectual in controlling the iritis; the adhesions would give way suddenly, the aqueous humor clear up, and the hypopyum be absorbed. Vitreous haziness was treated by invigorating diet and tonics. Sight would return in about six weeks.

29.—*Contributions to the Pathology and Therapeutics of Glaucoma.* By Prof. A. von Graefe, Berlin. [Archiv f. Ophthal., Bd. xv., abth. 3, s. 108–252.

Introducing first the subject of acute inflammatory glaucoma, Prof. Graefe considers the point, whether the loss of sight is due to disease of the retina, and states that it is sufficiently accounted for by the opacity of the media, except in the most severe cases; in which the retina must itself be damaged. The ecchymoses which so often follow iridectomy lead us to suppose an unusual brittleness (softening) of the retinal tissue, and this accords with that theory of the loss of sight which refers it greatly to paralysis by ischæmia, because of the hindered arterial supply. The prognosis of acute glaucoma after iridectomy is good, and that when the rules of the operation are not strictly observed. Iridectomy on one eye, for the acute inflammatory disease, is quite likely to be followed by an outbreak in the other eye. Especially if the other have already begun to show symptoms, this is likely to happen in twenty-five to thirty per cent. of the cases. If the second have had no prodromata, the liability is about ten per cent., and the attack takes place usually from the second to the fourteenth day.

The subject of secondary glaucoma is treated *in extenso;* the disease takes its rise from some precedent ocular affection, such as various forms of keratitis, of iritis, displacements of the lens, choroidal disease, posterior staphyloma, intraocular tumors, etc.

Then glaucoma simplex is discussed, and he concludes with some observations on the method of the operation, and on the hereditariness of glaucoma. Out of this long discussion we may select a few points.

Pannus of the cornea is not infrequently complicated by glaucoma. So long as this depends on serous iritis, as is indicated by the irritability of the eye to caustic applications, paracentesis may suffice—when glaucoma is fully declared, iridectomy alone is effectual. In the latter case the operation may sometimes aggravate the pannus, but soon this subsides. If, however, paracentesis were more frequently resorted to in the cases of bad pannus with deep anterior chamber, iridectomy would seldom be needful. Corneal cicatrices, when attended by adhesions of the iris, often demand iridectomy—as well for optical as therapeutic reasons. So urgent is this necessity that when a prominent leucoma adherens (partial staphyloma), follows ophthalmia neonatorum, Graefe would at once operate; and, if the diameter of the cornea begin to enlarge, and the anterior chamber to grow deep, the operation cannot be deferred.

The condition known as cornea globosa or hydrophthalmus congenitus, which begins *in utero*, is not suitable for the operation. A form of chronic keratitis in which an opacity runs across the cornea at the palpebral fissure, is attended by very moderate irritation, is composed of minute yellowish or brownish points, and progresses for months or years, is apt to end in iritic complication and glaucoma. For better understanding of this disease in its various stages, four pictures, three of them in color, are given. One, Fig. 4, shows a case of twelve years' duration, and the whole

globe in glaucomatous degeneration. Iridectomy should be done at an early period of this trouble, certainly immediately upon the occurrence of obscurations or limitation of the field. This affection has met the eye of every ophthalmic surgeon, but has never been so carefully described, and its natural history so fully followed out. Now that its tendencies to evil have been so well pointed out, the remedy which can arrest some of the mischief will not fail to be applied.

As to complications of the iris, not much need be quoted. Great stress is laid upon the importance of iridectomy when there is complete posterior synechia, and that in spite of the fact that at the time vision may not be much injured, and besides that by the operation a small fraction of visual acuteness may be sacrificed. The ulterior dangers of this condition are too serious to admit of parley. A curious fact is noted, that congenital coloboma iridis is no protection against secondary glaucoma, in case there should be displacement of the lens, or chronic choroiditis as sometimes happens; and such cases do not refuse to yield to the beneficial effect of iridectomy.

The irritation excited by dislocation or reclination of the lens into the vitreous is a difficult condition to treat. Sometimes when the lens touches the iris, iridectomy gives relief, but at other times nothing but extraction of the lens can do good, while this is extremely perilous because of loss of vitreous, cyclitis, etc. Wounds of the capsule in old people are followed by much more irritation of the eye than in children. In the latter, Graefe thinks it not needful to be so ready to do the operation as has of late years been the general disposition, because young eyes bear intraocular pressure remarkably well. He regards pushing forward of the iris a better index for iridectomy than mere augmented tension. This remark upon the intolerance of pressure in eyes of old persons bears unfavorably upon the attempt to hasten the maturity of imperfect cataract by discission.

Why serous choroiditis should sometimes lead to softening, and even phthisis bulbi, and in other cases to glaucoma, can only be conjectured. Age certainly exhibits the latter tendency, but we cannot account for the differences which we witness. If subretinal effusion have occurred, we very seldom see glaucoma. The chronic forms of choroiditis with pigment alterations very seldom result in glaucomatous tension. They are frequently complicated by vitreous opacities, especially in the equatorial variety of choroiditis, and the important remark is made, that paracentesis of the anterior chamber often has a decided effect in causing their disappearance.

Staphyloma posticum is frequently complicated by secondary glaucoma. The media remain clear, but tension increases, the nerve becomes excavated, the visual field contracted. There may be evidences of inflammatory action, in opacities of the vitreous, and of the aqueous humor, but most usually the symptoms are those of glaucoma simplex. The form of optic-nerve excavation deserves notice. It most usually does not exhibit the abruptness which belongs to pressure excavations, but, because of the precedent distention of the sclera, has on one side a sloping margin, and may not reach quite to the edge of the papilla. But, when, by light palpation, arterial pulsation is produced, and the vessels show irregular distention, and the visual field begins to be impaired, we must regard these excavations as glaucomatous. It is, moreover, peculiar to these cases that central vision long remains relatively intact, when peripheral vision has seriously failed. The limitation of the field often assumes the usual form beginning in the nasal side, but sometimes advances so as to surround the middle of the field by a zone of blindness, leaving beyond to the temporal side a region capable of sight. The peculiarities of this limitation are made clear by diagrams. The excavation above described may subsist for a long time

without disturbance of function. But, if this do occur, iridectomy is imperative. If sight has been so much damaged that defect of field comes close to the centre, iridectomy does sometimes impair the central vision. The effect of iridectomy on the progress of staphyloma cannot be stated—that in young myopes it improves the range of accommodation is positive.

The only form of retinal disease liable to be complicated by glaucoma is retinitis hæmorrhagica; this belongs to people beyond middle life, is attended by sclerosis of the vessels, and not seldom is succeeded by cerebral hæmorrhage. This form of secondary glaucoma Graefe has seen twenty-two times. In five cases the other eye suffered an attack of retinitis apoplectica after a few months; in six cases the second eye went through the same succession of symptoms as the first, viz., hæmorrhages, glaucoma, total loss. Unhappily, treatment by iridectomy or any other means does not help these cases. When, on account of persistent pain, an operation is to be considered, and the other eye to be protected, extirpation rather than iridectomy will claim preference.

That the essential feature of glaucoma consists in increase of ocular tension, Graefe finds fully confirmed in the case of glaucoma simplex, which name he accepts, and to which he devotes twenty pages. The difficulty lies in detecting the cause which provokes the hypersecretion. That it lies within and not outside of the eye, he thinks most probable; also, that rigidity of the sclera has much to do with it, whether this be a primary or secondary condition; that the effect is to be looked for in irritation of the secretory nerves, rather than in obstruction to the venous circulation; in this last point Graefe does not accord with the views of Stelwag. In these cases the results of iridectomy are peculiar. More than one-half of the cases are permanently benefited. In one-fourth the ocular tension is not completely reduced to the normal standard, and, though vision is longer retained than without operation, after a time the globe becomes harder, and a second operation is demanded.

In another quota, the benefits of the operation are of still shorter duration, and a second interference avails nothing, or only little. In five cases, two per cent. of all, iridectomy was followed by destructive inflammation and total loss of the eye. The behavior of the eye immediately after the operation gives indications for ulterior prognosis. If it continue hard, the anterior chamber not reëstablished within two days, permanent good is not to be expected; if tension is not abnormal, nor pericorneal irritation and neurosis increased, while the anterior chamber becomes filled in three or four days, the result may be good. But even though inflammatory reaction does not arise, if the globe continue hard, the neurosis remain, the iris and lens pressed against the cornea, and sight extinct, the case gives no hope. If there be any undue tension, the pressure-bandage must be omitted, and the plaster-strips applied; then atropine not to be used—the slightest pain controlled by morphia injections, calomel given as a purgative, and warm fomentations applied.

In some cases for which an iridectomy does little good, a second one on the opposite side of the iris has been found to be far more effectual than when done alongside of, and increasing the first excision, and, by careful comparisons, Prof. Graefe became convinced that this may be accepted as a general rule.

30.—*Contributions to the Anatomy of the Ciliary Muscle.* By Dr. A. Iwanoff. [Archiv für Ophthal., Bd. xv., Abth. ii., s. 284–298.]

In addition to his former researches into the anatomy of the ciliary muscle, contained in a previous number of the Archives, Dr. Iwanoff has undertaken to discover what differences it may have in myopic and hypermetropic eyes. That the difference of refraction involves a great difference

in the accommodative function has long been maintained, and a corresponding variety in the ciliary muscle is to be expected. It has been maintained that in hypermetropia the muscle would be found large and greater in bulk, while in myopia it would be thin and smaller. The examination revealed quite another state of facts. In twelve myopic eyes, whose axes were from 28 to 34 mm. in length, in all myopia being over one-quarter, there was no atrophy of the muscle, but it was thicker and longer than in emmetropia.

The muscle is composed of two sets of fibres—one external and running in the meridians of the globe, pointed out by Bowman and Brücke; the other set internal, at the anterior part circular in direction, and described by Arlt and H. Müller.

In myopic eyes the circular fibres were almost entirely wanting, and the meridional fibres unusually numerous.

In four hypermetropic eyes, whose axes were from 19 to 20 mm., the ciliary muscle was found thin and pushed forward, while in myopia it was thick and shoved backward. In hypermetropia, the posterior portion of the muscle was atrophied, the anterior part hypertrophied; that is, the circular fibres were in excess. The difference, then, in the structure of the muscle in myopia and hypermetropia is that in myopia the meridional fibres are most numerous, in hypermetropia, the circular most numerous.

The large development of circular fibres in hypermetropia affords a better starting-point for the action of the longitudinal fibres, and enables them to make the great effort to which the refractive condition compels them. Their line of traction is thus made more oblique from before, backward and outward—that is, coincides less with the surface of the globe, and more efficiently relaxes the zonula of Zinn.

The ciliary muscle of myopes must exert a greater traction on the choroid than of hypermetropes; and in this is the reason why the former have so much more frequently the atropic choroidal crescent at the optic nerve, because the pulling of the ciliary muscle on the choroid terminates at the latter's fixed point—the nerve. A similar effect occurs occasionally in hypermetropes, but far less frequently. Undoubtedly other factors have a part in the perineurotic choroidal atrophy of myopes, but the character of the ciliary muscle and its action are to be taken into account.

The above anatomical differences are important items in explaining with exactness the physiology of accommodation.

31.—*Cyst of the Iris.* By Dr. H. Knapp, of New York.

A Case of Cyst of the Iris. By Francis Simrock, M. D., of New York.

Cyst of the Iris cured by Operation, Zinn's Membrane forming its Anterior Wall. By Charles M. Allin, M. D., of New York. [Trans. of the Am. Ophth. Soc., 1870.]

Of the above, two cases are new. Dr. Knapp reported the good condition of the eye on which he operated a year ago, and which he narrated to the Society.

32.—*Results of Thirteen Passavant's Operations for breaking up Attachments of the Iris to the Capsule of the Lens.* By Dr. B. J. Jeffries, Boston. [Trans. of the Am. Ophth. Soc., 1870.]

There were four eyes operated on—one eye eight times within a month, another eye three times within a week; two other eyes each once. In all cases ether was given, and the results were satisfactory. Sketches are given of the outline of the pupils at various stages of the proceeding.

33.—*The Musculus Dilatator Pupillæ, in Mammalia, Men, and Birds.* By Johann Dogiel. [Archiv für Mikroskop. Anat., Bd. vi., Heft i., pp. 89–99.]

The existence of the muscle is demonstrated by long treatment of the iris in weak acetic acid, and subsequent coloring by an acidulated mixture of carmine and glycerine.

34.—*The Effect of Atropia on Intra-ocular Pressure.* By Dr. Adamiuk, of Kazan. [Annales d'Oculistique, lxiii., p. 108, March and April, 1870.]

Intra-ocular tension is the result of the lateral pressure on the walls of the vessels, the fluid contents of the globe being regarded as products from the vessels.

Atropia, by experiment, has been shown to diminish the exosmosis of fluids from the vessels. If a fine trochar is inserted into the anterior chamber, about five drops of aqueous humor escape; but, if the eye is under the influence of atropia, only about three drops escape. The pressure in a cat's eye stood at 23 of the manometer, and rose to 33, after irritating the conjunctiva by spirits of ammonia. In the other eye to which atropia was applied, the manometer indicated only 28 under the same irritation. In the first eye, after cessation of the irritation, the manometer fell to 28; in the second eye, it fell to 21, proving that atropia had hindered the exosmosis.

The effect of atropia on the vessels is not to paralyze them, but, on the contrary, it stimulates them to contraction. If the sympathetic be cut, the quantity of filtrate from the vessels is doubled. Finally, it is shown that the filtrate from the vessels, when affected by atropine, is less plastic than at other times. This has a direct influence on the exudation of inflammation.

LENS AND VITREOUS.

35.—*Communication to the Editor upon the Peripheral Linear Section for Cataract.* By Prof. A. von Graefe. [Monatsblät. für Augenheilkunde, January, 1870.]

In this article Prof. Graefe comments on the objections which Steffan made to his mode of operating. Among other things, he asserts the wound which he makes to be 5‴ in length, which is about 11 mm., or $\frac{7}{16}$ of an English inch. He says that he was at this time, the latter part of 1869, in the eleven hundredth of his operations by peripheral linear section. Of his last four hundred he had yet made no report, and of them there was little to be said. But, as to opening the capsule, he had adopted a plan which A. Weber employed—to make two vertical cuts in the side of the pupil, then a transverse cut below, and another transverse one above, within a millimetre of the upper border of the lens. Thus a square piece is included, and may sometimes be brought out, but always leaves a clearer pupil.

Considerable space is given to the after-treatment. The padding over the eye to be soft, uniform in pressure, and the whole dressing comfortable to the patient. He expresses himself decidedly against leaving the dressing unchanged for several days, having, he says, experimented carefully enough to be satisfied on this point.

Having operated in the afternoon, the bandage is removed in the evening, and again next morning, and afterward daily, or, without harm, twice daily. On the first evening, sufficient opening of the lids to let out clots or lens-matter, and to see with a candle the lower part of the cornea, is useful, and not dangerous.

He lays the greatest stress on the importance of preventing pain. He

operates usually without anæsthetic; if the pain of the wound do not subside soon, but rather tends to increase, he gives a hypodermic injection of sulph. morphiæ in the temple. If this do not give relief, the bandage is taken off, and a soft, moist sponge applied for a few minutes to the eye. This relates to the period up to three hours after the operation. After six hours have passed there should be no specially unpleasant feeling about the eye: if there be, it must not be lightly regarded, but met either by a second morphia-injection, or, if the pulse is excited, by taking four to five ounces of blood.

To insure good sleep, if it be uncertain, give 40 grains of chloral—this to depend on the effects of morphia already, perhaps, administered, and may require to be repeated.

The time of reaction of the wound is from the twelfth to the twenty-fourth hour. If there be any pain toward morning of the first night, the bandage should be taken off; if there be no chemosis, or swelling of lids, the wound need not be inspected, and the freshening of the eye and additional morphia will suffice. But, if the secretion of tears be copious, the upper lid puffy, energetic means must be adopted. The wound to be inspected to know if suppuration threatens. The skin of the lid to be touched with lapis mitigatus; the bandage to be more snugly applied, and from robust patients a venesection of six ounces, to be followed in half an hour by a morphia-injection in the temple. A free calomel-purge is given soon after the venesection. With weakly persons, the bleeding is omitted, and the dose of calomel made moderate. Usually in six hours afterward a decided improvement is found in the symptoms. The utility of the bleeding is limited to a very early, and that the initial, period; when suppuration has begun it is useless. For this, the caustic to the outer surface of the lid is his chief reliance, and the bandage changed every six hours. To feeble patients he gives quinine. If there be gastric irritation on the second day, he does not hesitate to give an emetic, and continues the cauterizations and bandage. For suppurations he uses warm fomentations only for a short time when the bandage is changed, not now resorting to them so much as formerly. Iritis he treats in the usual way.

36.—*Graefe's Peripheral Linear Section.* By Dr. STEFFAN. [Monatsblät. für Aug., February and March, 1870.

The author, who took exception some time ago to certain assertions about this section, now concedes that, as Graefe says, it is possible to bring out the largest lens through a peripheral linear section, whose internal length shall be 4.5‴, and the height of the flap 0.5‴; but he asserts that this section is much more difficult than to make a flap on the periphery with a height of 1½‴ to 2‴. He finds the latter yields him better results than the former, and thinks the directions Graefe gives must be adhered to in the minutest particulars in order to secure a success approaching what he gives.

37.—*Remarks on some Practical Points concerning Cataract-Extraction.* By Dr. H. KNAPP. [Trans. Am. Oph. Soc., 1870, pp. 143–147.]

38.—*Beiträge zur Normalen und Pathologischen des Auges. Contributions to the Normal and Pathological Anatomy of the Eye.* By Dr. IWANOFF, with 5 plates. [Archiv für Ophthalmologie, Bd. xv., Abth. 2, s. 1–105.]

The principal part of the paper is a discussion of the occurrence of detachment of the vitreous.

A distinction is first made between dissolution of the vitreous body and its detachment from the retina. The former has long had a place in text-books, under the name of synchysis—the latter has not been obseevrd

until within a few years. The pathology of synchysis consists in fatty degeneration of the cells and stroma of the structure. It begins at the deepest parts of the substance, spreads gradually to the remaining parts, and occurs most frequently in old people. This change belongs to the series of senile involutions, like arcus senilis, the condensation of the lens, etc. Dissolution and detachment of the vitreous are much more emphatically morbid in their character, and often the precursor of detachment of the retina.

The cases in which this change is described are those of penetration of the eye by foreign bodies, of extraction of cataract, of contusion, of extreme myopia, and of glioma. The morbid appearances are given in detail, and the conclusions are as follows: That the hyaline membrane is nothing more than the membrana limitans interna retinæ—and not an independent structure—a view which Henle has already declared. Sometimes this attaches itself to the vitreous and sometimes to the retina, and has thus received distinct names, according to its relationship.

How detachment of the vitreous occurs in myopia, in staphyloma of the cornea, or after extraction of cataract with loss of vitreous, is not difficult to understand. The vitreous either does not completely fill up the eye, or there is a sudden relief of tension of the globe—it is not surprising that a serous transudation should occur, as it were, *ex vacuo*. The vitreous may for a long time remain but little changed in contact with this fluid, or it may undergo extensive transformation into connective tissue, with shrinking of its bulk.

A most interesting process is detachment of the vitreous after penetrating wounds by foreign bodies. It usually becomes funnel-like in form the apex at the optic nerve, the base at the equator. This condition is very slow in being developed, and depends on what many observers have described, viz., the change of the vitreous into connective tissue. Around the foreign body cells first appear of rounded forms; they become stellate, fusiform, etc., and extend into other portions of the vitreous; fibres soon appear, and, by absorption of the more fluid parts, the whole becomes converted into connective tissue, with condensation and shrinkage. Now the retina becomes detached by effusion behind it, or the effusion may simply fill up the space between the vitreous and the retina. A similar explanation may be given in cases of irido-choroiditis, without the presence of a foreign body. To this category also belong many of the cases of blindness following the operation of reclination of the lens.

And, in extracting cataract, the mischief which may possibly follow the loss of vitreous is not confined exclusively to the period of healing, but may appear at a later time, after months or years, in consequence of similar changes in the vitreous.

In enucleated eyes detachment of the vitreous is now more frequently seen than formerly, because this is to be looked upon as a stage preliminary to detachment of the retina, and the enucleation is done at a much earlier period in the symptoms than before.

39.—*History of the Corpus Vitreum and its Forms of Inflammation.* By Prof. v. HASNER, Prague. [Vierteljahrschrift für die praktische Heilkunde, Band ii., 1870, s. 1–12.]

A brief review is given of the views, ancient and modern, of the anatomy of the vitreous, and the nature of its morbid processes. Stilling, by means of carmine staining, was able to show that there is a central body or nucleus situated rather forward, and a peripheral substance having a laminated character; also that there is a central canal from which fissures proceed in a threefold direction. The nucleus is intersected by a net-work of anastomosing cells. These cells, with long, delicate processes,

have been described by Iwanoff and others, while Finkbeiner, Hannover, and Coccius, found large flat epithelium. The latter forms would seem to exist in the outer layers, while the irregular and anastomosing cells occupy the interior. The gelatinous transparent substance surrounds and contains them. From the undoubted fact of the presence of cell-forms, a theory of inflammation of the vitreous may be built up, and Prof. Hasner subdivides it into serous or hydrops vitrei, plastic or hypertrophic, and purulent.

The condition formerly called synchysis he would designate as hydrops of the nucleus. Let this condition be exaggerated so as to cause increased tension and its results, and then the author finds the etiology and symptomatology of glaucoma fully accounted for. Holding, as he says, this view, which is returning to the pathological notions of centuries past, the author does not attempt to explain the various phases of glaucoma, nor meet the many objections which would at once be raised. Hydrops of the outer layers was anatomically discovered by H. Müller in 1856, and has been more recently investigated by Iwanoff, under the name of detachment of the vitreous. He shows how this may be the origin of subretinal effusions, as well as of shrinking of the vitreous body. The presence of opacities in the vitreous is explained by the products of cell-metamorphosis, and crystals of cholesterine may be expected to occur in any collection of serum which contains protein substance or fat—this readily explains the old synchisis scintillans.

Inflammatory action will further produce connective tissue under its various forms of membranes, fibres, etc., while blood-vessels and pigment may also appear. In this way we are able to account for a large part of the flocculent and other floating bodies seen in the vitreous, without invoking the intervention of the choroid and ciliary body. From these sources we have hæmorrhages and products of inflammation effused into the vitreous, but can always find other evidence of their action besides the effusions.

40.—*On the Pathology of the Vitreous.* By Dr. Hermann Pagenstecher, of Wiesbaden. [Archives for Ophthal. and Otol., vol. i., No. 2, pp. 500–552.]

A series of thirty-two experiments upon rabbits' eyes forms the basis of this attempt to settle the question whether the vitreous is capable of primary idiopathic inflammation. The evidence of inflammation is assumed to be the presence of pus, or lymphoid cells, or the development of connective tissue.

To excite inflammatory action in the vitreous, irritating substances like croton-oil, or bits of wire, etc., were introduced into it, and the resulting changes minutely observed during life by the ophthalmoscope, and the eyes submitted to microscopic inspection after death.

In his statement of the normal anatomy of the vitreous, the author agrees in the main with Iwanoff, but prefers to regard the several kinds of cells which may be discovered in it as varieties of only one primary form. It is characteristic of these cells that, while in their simplest form they are simply round, and have one or two nuclei, they undergo remarkable alterations, by shooting out irregular processes and projections; they become stellate, fusiform, filamentous; and frequently, by long threads, form connections with neighboring cells. They are contractile, slightly granular, and as closely resemble, in their primitve state, lymph-cells as the latter resemble white blood-globules. By their property of contraction and outgrowth, as well as by subdivision, they become transformed into the irregular types which may always be seen under the microscope. Even the physaliphorous cells of Iwanoff, in which one vesicle is contained within another, have been seen to proceed by successive modifications from the simple round cell. Hence, admitting the correctness of the description of the

many kinds of cells in the vitreous, the author prefers to trace them back to one form, of which all the irregular forms are but modifications.

Dr. Pagenstecher does not find epithelium on the surface of the vitreous any more than does Iwanoff.

The effect of the experiments was, of course, to cause opacities in the vitreous, and inflammatory changes also in other structures. As is already well known, the opacities exhibit lymphoid cells, and contractile round cells, with various modifications and connective tissue. But the lymphoid cells Dr. Pagenstecher believes are not generated in the vitreous, but make their way into it, as Cohnheim announced, from the enveloping membranes. He thinks this is so, because the connection of the cloudiness of the membrane around could always be anatomically proven. The details arguing in favor of this opinion are given in full. Not only did he always trace a connection of the lymphoid elements with the surrounding tissues, but the filamentous and membranous opacities he asserts also proceeded from the place of puncture. In one rabbit two fine glass tubes remained floating eight days in perfectly clear vitreous, until at last one came in contact with the wall of the eye, and opacity began.

The conclusion drawn from his experiments is in the following statement:

"That, in the vitreous, neither the gelatinous substance nor the elements contained in it, of whatever kind, are capable of inflammation from irritating causes sufficient to produce it elsewhere, nor of forming lymphoid corpuscles by morphological changes."

That is to say, the vitreous reacts sluggishly to irritating causes, and, when pus appears, it comes from an external source. A second and third formula are merely repetitions of the substance of the above, while the fourth conclusion is an assertion that "the vitreous cannot be said to be susceptible of inflammation in the same sense in which we use that phrase of other organs; but that every so-called inflammation of it is to be considered as a secondary state, depending on the changes in surrounding tissues."

This fourth conclusion in its first clause hardly needs to be stated, because the fact is self-evident; but the latter clause is not likely to be admitted merely on the proof which the author's reasoning and experiments afford. So long as lymphoid or pus cells only are to be the visible evidences of inflammation, his cases have weight, and coincide with clinical experience, for we know nothing of spontaneous suppuration of the vitreous. But he attempts to show that connective tissue cannot originate in a primary hyalitis, but that this must always be excited by an irritation of the neighboring tissues. Now, he describes how connective tissue results from metamorphosis of the normal histological elements or cells of the vitreous; and he admits that cell-growth and connective-tissue growth are facts of inflammation. That these cannot appear in the vitreous except through irritation of the surrounding membranes may yet be shown, but we cannot convince ourselves that these experiments prove it, notwithstanding the author's arguments, because every one of his experiments involved a wound of the surrounding membranes or tissues.

The present stand-point of pathology decidedly favors the view that every tissue possessing cells has inherent in it not only the power of self-maintenance through the office of these cells, but by their perverted and exaggerated activity can call forth true inflammatory action: hence, we wait to be convinced that a primary hyalitis is impossible.

The paper concludes by a description of the various kinds of opacity found in the vitreous: 1. Inflammatory; 2. Blood; 3. Such as may be called coagulations. The first disappear in part through fatty degeneration. The second are absorbed by enclosure of the blood-corpuscles in the contractile

cells which are furnished from the surrounding membranes. "The latter (viz., the contractile cells) change the coloring matter of the same (meaning the blood) to pigment, and may by further metamorphosis transform themselves into the cells of connective tissue in the vitreous. This hints at a very interesting process of absorption.

The third kind of opacities, the coagulations, result from contact with air or chemical reagents. The author suggests that the cloudiness seen sometimes about foreign bodies *in vitreo* may not be inflammatory, but the effect of coagulation. The opacity which soon occurs in prolapsed vitreous is thus easily explained.

41.—*Cases of Foreign Bodies in the Vitreous Humor.* By Henry D. Noyes, M. D., New York. [Trans. Am. Ophth. Soc., 1870, pp. 104–108.]

One case is notable because the foreign body had remained two months within the eye, plainly visible by the ophthalmoscope, without causing any irritation.

The other case is remarkable from the occurrence of total detachment of the vitreous humor, after its conversion into connective tissue, while the retina remained in its proper relations, and but little diseased. The bit of percussion-cap which had caused this mischief had been in the eye sixteen months. A woodcut aids in the explanation of the lesion.

42.—*Foreign Body in the Eye diagnosticated by Limitation of the Visual Field.* By Dr. T. R. Pooley, New York. [Trans. Am. Ophth. Soc., 1870, pp. 108, 109.]

The case was seen four hours after the injury. There was a wound in the upper and inner corneal margin, 3‴ long; the lens clear; blood prevented the use of the ophthalmoscope. Examination of the field of vision by a candle-flame discovered the upper and inner quadrant to be blind. On this symptom the presence of the foreign body in the eye was diagnosticated. This point was first brought forward by Dr. Berlin, of Stuttgart. Next day, severe inflammatory symptoms having set in, the eye was removed. A piece of steel was found in the lower and outer part of the eye, and around it was considerable hæmorrhage.

REFRACTION.

43.—*Apparent Form of Inverted Ophthalmoscopic Image of Optic Disk in Astigmatism.* By Dr. G. Hay, of Boston. [Trans. Am. Ophth. Soc., 1870, pp. 86–88.]

It has been stated that the inverted image of the optic disk of an astigmatic eye, viewed by the ophthalmoscope, is elongated, so that the long axis corresponds to the meridian of least refraction. Dr. Hay shows that this is not uniformly true; that the form of the nerve-image depends on the distance at which the objective lens is held from the eye. If we suppose the lens to be of three inches' focus, and held about three inches from the eye, the nerve will appear circular notwithstanding the astigmatism; that if the lens be held nearer than three inches, the image will be oval, and the long axis correspond to the meridian of least refraction; if the lens be held farther than three inches, the image will be oval, and its long axis correspond to the meridian of greatest refraction. This was shown experimentally by glasses, and is demonstrated in the article by mathematical formulæ.

44.—*A Remarkable Case of Triplopia.* By Dr. Dufour, of Lausanne. [Klinisch Monatsbl. für Aug., February, 1870.]

The patient was twenty years old, myopic $\frac{1}{4}$, at the age of twelve received a blow with the fist in the left eye.

This cornea was unusually large; pupil and lens decentred inward about one mm., and at temporal side of iris was a slit in the direction of the radiating fibres, by which light could enter the eye. The edge of the lens came to the middle of the slit. Rays would enter the eye, first, by the natural pupil; second, by the inner half of the slit, and, because of the myopia, they would cross in front of the retina, and give two images; third, rays would enter by the outer half of the slit, and not pass through the lens at all, but beyond its rim, and form a third image on the retina—hence the triplopia.

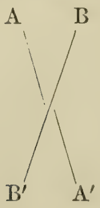
The interesting features of this case, and the alteration in the relative positions and distinctness of the images produced by various convex and concave glasses, are fully detailed. The changes caused by accommodation and by various prisms are curious. If a prism were held vertically before the other eye, then the patient saw four images.

45.—*A New Ophthalmoscope*, by Dr. E. Javal, is alluded to in the proceedings of the Académie de Médecine. [Gazette Hebdomadaire, May 6, 1870, p. 278.]

The mirror is a plate of glass covered by a thin layer of platinum, and the lenses which serve to correct the refraction of the patient or the observer are replaced by a small Galilean telescope. This, by a simple mechanism, is made to act as an optometer, and is exact as well as convenient. A greater magnifying power is attained by this contrivance than by ordinary instruments, while the remark is made that the instrument is capable of improvement in some details. It is a great desideratum to be able to correct hypermetropia and myopia, in all degrees, without the trouble of changing the glasses, and to gain a greater amplification of the fundus, and we hope this new ophthalmoscope may be perfected.

46.—*A New Method of Producing Stereoscopic Effect.* By Listing. [Quoted in Zehender's Monatsblät., January, 1870, p. 29.]

This new experiment of Listing, who has already done so much in physiological optics, brings out stereoscopic effect with only one picture, which consists of figures arranged in a peculiar way, and seen with vertical double images. The simplest experiment is to view two lines crossing each other at an angle of about 30°, with a prism of 4° or 5°, its base vertical before one eye. No effort must be made to correct the vertical diplopia. If the prism be put before the left eye, its base upward, the line B B′ seems nearer to the eye than A A′. If the prism be turned with its base downward, and before the same eye, the line A A′ seems nearer, and B B′ more remote. I find with the base downward the prism must be weaker than when turned with the base upward. In gaining the effect by prisms so weak as these, no double vision is produced except for horizontal lines—the oblique lines appear to be only two. The same phenomenon may be produced in a common stereoscope by having two similar figures, and pushing one alternately up and down. Two rows of the same letters are arranged on a page like the limbs of the letter X, and viewed as above stated with a vertically deflecting prism; a sudden removal of one now takes place to a considerable depth, while this appearance is at once reversed on turning the prism



around 180°. These curious effects can only be produced and understood by means of the diagrams accompanying the article.

47.—*Do the Eyes perform any Rotation on the Optic Axes in Lateral Inclinations of the Head?* By Dr. JOSEPH AUB. [Archives of Ophthal. and Otol., vol. i., part ii., 659.]

By a method of experiment suggested by Dr. Knapp, Dr. Aub was able to prove that the eyes turn in the same way and to the same degree as the head when it bends sidewise—that is, the vertical meridians preserve their relation to the median plane of the head. This comprises in detail what was asserted by Donders twenty years ago.

48.—*The Influence of Spectacles on the Optical Constants and Visual Acuteness of the Eye.* By Dr. H. KNAPP. [Archives of Ophthal. and Otol., vol. i., No. ii., pp. 377–410.]

Among the interesting deductions which are brought to light in this paper is the statement that "spectacle-glasses held half an inch before the eye do not change the situation of its anterior cardinal points, nor its anterior and posterior focal lengths, but the situation of each of the posterior cardinal points is altered in such a manner that convex lenses make them advance, and concave glasses recede by the same quantity. This result comes about, because the spectacle-glass occupies the place of the first focal point of the ocular system, which is 12.918 mm. from the surface of the cornea—and this is almost an exact half inch. The change of place of the second nodal point of course alters the visual angle and the apparent size of objects. This fact has long been understood with reference to normal eyes, and is of daily experience in presbyopia. But the author proceeds to discuss the effect of glasses on hyperopic and myopic eyes for purposes of distant vision. As these errors are due to shortening and lengthening respectively of the visual axis, the author assumes that the number of percipient elements is the same in hypermetropic, myopic, and emmetropic eyes, the difference being merely one of condensation or dispersion.

Taking this hypothesis for granted, it is shown that in hypermetropia and myopia glasses do not alter the visual angle, but do alter the size of the retinal image, because in hypermetropia, by advancement of the nodal point, the image covers more retinal elements than in emmetropia, and in myopia by the recession of the second nodal point the image covers fewer retinal elements than in emmetropia, these elements being crowded into a smaller area in hypermetropia, and scattered over a larger area in myopia. The degree of visual acuteness proper to various degrees of hypermetropia and myopia is next calculated, and put into tabular form—the distance being given at which Snellen XX should be read when the myope or hypermetrope is armed with suitable glasses, and showing how much should be added to the average reading-distance for hypermetropia, and how much may be subtracted from it in myopia, and still vision be reckoned normal.

In comparing Dr. Knapp's figures with some examples given by Mauthner, page 227, in which he calculates the length of the visual axis for ametropia, some discrepancies are to be seen; and if Dr. Knapp's table on page 397 be compared with Dr. Loring's in the *American Journal of Medical Sciences* for April, 1870, page 335, and which is calculated from Mauthner's formulæ, there will be found to be scarcely any agreement between them. Dr. Knapp asserts that the amount of displacement forward or backward in equal degrees of hypermetropia or myopia is the same. Dr. Mauthner, and after him Dr. Loring, figures out decided differences. Thus, says Dr. Loring, H$\frac{1}{2}$ equals a shortening of the visual axis of 3.96 mm.; M$\frac{1}{2}$ equals

a lengthening of the visual axis of 8.6. Dr. Knapp says that both $H\frac{1}{2}$ and $M\frac{1}{2}$ indicate a shortening or lengthening of the visual axis of 5.4544mm. Evidently some mistake has been made in somebody's calculations.

Dr. Knapp's assumption that hyperopic eyes contain the same number of percipient retinal elements as do emmetropic eyes may be well enough admitted for his purposes; but, as hyperopia is an arrest of development, and, when of great degree, is accompanied by a decided amblyopia, we may be justified in suspending our acceptance of the assertion he makes until anatomical investigation has proved it. Of course, the only mode of proof is by counting the number of rods and cones in a given area of an emmetropic eye, and also of a hypermetropic eye.

The whole paper is interesting, and masterly in its discussion, and concludes by giving similar calculations for visual acuteness in eyes operated for cataract, and furnished with suitable glasses.

49.—*An Additional Test for the Diagnosis and Correction of the Optical Defects of the Eye.* By WILLIAM THOMPSON, M. D., Philadelphia. [Am. Journal of Medical Sciences, January, 1870, pp. 76–80.]

An Additional Method to determine the Degree of Ametropia. By WILLIAM THOMPSON, M. D. [Am. Journal of Medical Sciences, October, 1870, pp. 414–420. Transactions of American Ophthalmological Society for 1870.]

The above papers relate to the experiment, first made by Scheiner, in 1619, by which an object, seen through two or more small holes in close proximity, forms a double or multiple image on the retina in case the retina is not placed accurately at the focus of the refractive media. Scheiner called attention to this in reference to the function of accommodation; Dr. Thompson shows how the same fact may be made to apply to the diagnosis of errors of refraction in general. He puts in front of the eye a blackened screen perforated with pin-holes one-eighth of an inch apart, and views a gas-flame as an object. If the eye be in any sense ametropic, the flame appears double: by putting a red glass over one hole, say the right, the red flame appears in hypermetropia to be on the left side, in myopia on the right side. The object is placed at a distance, and in hypermetropia the accommodation must be relaxed. As Dr. Thompson remarks, this method becomes practical in the case of extreme amblyopia, where test-types may not be distinguishable. In these cases, however, we may reach the diagnosis by the ophthalmoscope. A special case alluded to, in which there was considerable opacity of the lens, making diagnosis by the ophthalmoscope unreliable, does afford scope for the exercise of Dr. Thompson's ingenious suggestions. But we can scarcely believe that they will very often be resorted to.

In the second paper the method is more fully wrought out, and a simple rule of calculation is given, by which the distance of separation of the double images affords the means of deciding the degree of ametropia, and prescribing glasses. This is applied to astigmatism as well as to other refractive defects. The calculation is easy, and the elements are only those of simple proportion. A patient sits at five metres, about seventeen feet, from a gas-light turned low, he looks through two holes, in a disk placed close to his eye, which are five mm. in diameter and four mm. apart. He sees two flames; the surgeon, placing himself by the gas-light, brings a candle-flame into a position coinciding with the false image, and measures its distance from the gas-flame. Take a case—a patient operated for cataract saw the double lights ten inches or 250 mm. apart; his glass is obtained by the problem $\frac{5000 \times 4}{250} = 80$ mm. The distance of patient from the object,

5,000 millimetres, multiplied by the distance between the perforations, viz., four millimetres, and divided by the separations of the images he sees, gives the needful glass, whose focal length is 80 mm. or 3.2 inches. The distance of the nodal point from the spectacle-frame, which is half an inch, must be allowed for.

That this method of determing ametropia will supersede the usual test-types and glasses the author does not expect, nor do we see that it is likely to have a considerable degree of utility, but we must commend the success of the endeavor, and the ingenuity of the devices employed. It is at any rate an interesting study in physiological optics.

RETINA AND OPTIC NERVE.

50.—*Upon the Termination of the Optic-Nerve Fibres in the Retina.* By Max Schultze. [Archiv. für Microscop. Anatom., Bd. v., pp. 379–403.]

The chief point is the discovery of minute hair-like fibres standing on the outer surface of the membrana limitans externa. They are seen with a magnifying power of one thousand diameters, and lie between the rods and cones. Max Schultze thinks they may be the terminal portions of the optic-nerve fibres, and be in connection with the primitive fibrillæ into which he finds the inner members of the rods and cones divisible.

51.—*Upon the Macula Lutea of Man and the Ora Serrata of some Mammalia.* By Dr. Fr. Merkel. With 2 plates. [Leipsic, 1870, pp. 20 in 4to.]

52.—*The Light Streak seen in the Centre of the Retinal Vessels with the Ophthalmoscope.* By Dr. E. G. Loring, New York. [Trans. Am. Oph. Soc., 1870, pp. 122–128. With 2 woodcuts.]

The explanation hitherto given of this light streak, and which has been generally accepted as it is stated by Jaeger, is that it is the effect of reflection from the column of blood in the vessel. Dr. Loring, by a simple apparatus of a glass tube filled with red fluid, placed at the bottom of a box, demonstrates that the light streak does not come by reflection from the column of fluid, but by reflection from the surface behind the tube, transmitted through the fluid. As the surface behind the tube has greater or less reflecting property, the light streak is more or less intense or is wanting. The apparatus imitates sufficiently well the conditions which exist in the fundus oculi, and makes his reasoning clear and indubitable.

The absence of the light streak in the choroidal vessels is stated by Jaeger to be due to the greater thickness of the walls of these vessels, by which their transparency is abated so much that they become visible as opaque objects in their entire diameter. This explanation agrees equally with Dr. Loring's explanation—it being conceded that the walls of the retinal vessels are so thin as to be practically transparent. It is readily understood that, where the blood is very dark, the reflex must be diminished, although perhaps not abolished—hence the fainter streak seen in the retinal veins.

53.—*The Channel by which in Cases of Neuro-Retinitis the Exudation proceeds from the Brain into the Eye.* By Dr. H. Knapp, New York. [Trans. Am. Oph. Soc., 1870, pp. 118–120.]

While the anatomical studies of Schwalbe and Schmidt have shown us that exudation may travel along the intervaginal space of the double sheath of the optic nerve from the arachnoid to the lamina cribrosa, Dr. Knapp makes a further suggestion as to its progress into the interior of the eye. He thinks it percolates through the lamina cribrosa and spreads out into and around the head of the nerve. Finding extreme neuro-retinitis in

two cases of brain-disease with very little damage to sight, he measured the size of Mariotte's blind spot and found it increased in one patient two and a half times, in the other four times its proper size. To quote the words of the article:

"This enlargement of Mariotte's blind spot can, to my mind, only be explained thus: The exudation—fluid and white blood-corpuscles—travels from the arachnoidal cavity into the inter-vaginal space, oozes through the periphery of the lamina cribrosa, and expands into the soft tissues around the margin of the optic disk, the suprachoroid, choroid proper, and retina. The optic-nerve fibres of the latter, situate farthest from the origin of the exudation, will be attacked least and last. The rods and staves, however, the percipient layer of the retina, will be affected sooner, and have their function either destroyed or, in case of recovery, kept in abeyance. The enlargement of Mariotte's blind spot, which I found to correspond to the extent of the exudation visible with the ophthalmoscope, proves this conclusively. In addition, I may strengthen this theory by the following facts: The rods and staves are delicate organs, and more easily destroyed than the nervous fibres. The exudation, seen through the ophthalmoscope, has its summit at the margin of the optic disk. Extending in both directions, between the fibres of the optic-nerve entrance, and into the choroid and retina, the most destructible parts it meets on its way are the rods and staves, the nutrition of which, moreover, is dependent rather on the choroid than on the retina. If the exudation passed through the optic nerve itself, there would be, in consequence of a like pressure on *all* the nervous fibres, an equal diminution of visual acuteness over the whole field of vision. The anatomical study of specimens alone can fully explain this process. But since this has not yet been done, and specimens are exceedingly difficult to obtain, I thought it well to present my views on this subject before the members of this Society, thereby calling their attention to it, in order that no opportunity may be lost, both with regard to the clinical observation and the anatomical investigation of neuro-retinitis."

54.—*Some Curious Phenomena resulting from Reflex Nervous Action in consequence of Traumatic Lesion of the Eye.* By Dr. C. A. Robertson, Albany. [Trans. Am. Oph. Soc., 1870, pp. 110–113.]

A man, aged forty-one, received a severe blow on the left eye at the time when Dr. Robertson saw him. Staphyloma of the sclera and cornea had formed, globe very hard, cornea insensitive to touch, very little pain—no perception of light. After two months, staphyloma increased greatly, and spontaneous rupture took place, and was repeated two or three times afterward. Patient refused enucleation. After several additional months, Dr. Robertson was called to see him, suffering from symptoms thought to be precursory of typhoid fever, or due to some kidney-trouble.

"The patient was exceedingly weak, and without appetite. Pulse was full and soft; skin moist; but sometimes (as stated to me) dry and hot; tongue moist, coated white; urine scanty and bowels constipated. A frequent twitching or spasm of the body occurred. Expression of the face dull, almost stolid. The fingers of one hand were constantly rubbing or working on the *ala* of the left nostril. Patient made no remark, except when questioned, or when startled by a sudden noise. In answer to question, he said his eye did not hurt him, but he had darting-pains in the head. The staphyloma was larger than I had seen it before. His manner was listless, and his mind enfeebled rather than delirious, although he was sometimes decidedly delirious at night, as his wife stated. He would wake frequently, as if from a frightful dream, and spring up excitedly in bed, trembling with terror, and it would be long before he regained his com-

posure. Even when awake, and in the daytime, a sudden noise in the house or street would startle him and make him exclaim, while shaking with fear, 'What's that?'

"On consulting with the attending physician, I stated my opinion to be that all the symptoms were due to perverted action of the reflex nervous system, and that the diseased eye was the exciting cause of all this perturbation. I urged the immediate abscission of the front of the globe, since the patient had previously refused to have the entire ball removed. He smiled at what seemed to him the absurdity of my opinion. He concurred with me that the eye was a hideous deformity, and that the patient could endure an operation for its removal, and with that view he would not oppose an operation as an experiment to confirm or subvert my opinion. Accordingly, chloroform was procured and the patient anæsthetized. A liberal abscission was made, according to the method of Mr. Critchett, of London.

"All perverted nervous action ceased after the operation. During the first night the sleep was refreshing and bnt little disturbed. In a week after removal of sutures the patient came to my office to show himself, having travelled eight miles. All local irritation had subsided, and an excellent stump existed for the support of an artificial eye. He called himself a well man.

"The nervous phenomena of this case are exceedingly interesting. From the appearances presented by the eye, it was evident, as before said, that the chief violence of the blow was expended upon the superior portion of the ciliary region of the eyeball, and not upon the brow. The iris and ciliary region, and to some extent the cornea, are supplied by filaments cf distribution from the ophthalmic or ciliary ganglion of the great sympathetic nerve, situated on the outer aspect of the optic nerve in the posterior chamber of the orbit. A few of the ciliary nerves are derived from the naso-ciliary nerve. This ganglion serves as a medium of connection between the trifacial (branches of which are largely supplied to the cornea) and the oculomotor, or third pair. The nasal nerve is a branch of the frontal, and, besides its ciliary relations, is also joined by a filament of the sympathetic.

"These nervous connections will account for the irritation about the nose, the head-pains, and the cerebral symptoms, while the spasms and other constitutional disturbances were doubtless caused by irritation of terminal branches of the great sympathetic nerve."

55.—*Pulsation of the Vena Centralis Retinæ in Cases of Epilepsy and kindred Affections.* By Prof. Köstt and Dr. Niemetschek. [Vierteljahrschrift für die praktische Heilkunde, part ii., pp. 81–93, part iii., pp. 1–50, 1870.]

This article purports to be an extract from a work upon the uses of the ophthalmoscope in appreciating diseases of the insane. It consists of a series of thirty-six observations recorded in detail, followed by conclusions drawn from these and other cases, which amount to 250 individuals and 468 eyes examined.

The cases given in detail are well stated, and the ophthalmoscopic examination shows familiarity with the instrument. The degree of vision is seldom noted, and the visual field appears not to have been attended to. In many patients it would not have been possible to ascertain these facts, but it is certainly desirable to have them. Forty-six closely-printed pages are devoted to the detail of thirty-six cases, which we cannot attempt to analyze. In all of these, and in sixty-six eyes, there was a venous pulse. The cases are put into three categories: 1. Twelve who were decided

epileptics and maniacal as well. 2. Seventeen having clear epileptiform symptoms. 3. Seven in whom these symptoms had existed, and passed away.

Out of the thirty-six cases, four had opacities of the lens, and eleven were hyperopic—a defect of development which in this connection has special meaning. The optic disk showed no alteration of form in fifty-four cases; in nine it was oval, five times vertically, four times transversely—the oval shape in some cases produced by astigmatic refraction. In twelve eyes the nerve was excavated to a greater or less degree, and in this circumstance there is no special importance. Anomalies in the color of the nerve deserve careful attention. Its normal hue the author calls a grayish red and this is deeper on its nasal side, because the fibres and capillaries are thicker than on the outer half. In anæmia the outer or temporal side of the nerve becomes more pale and transparent, so as to permit us to discern deeper parts, as the lamina cribrosa. In six cases only one-half of the nerve, and in nine cases only one-third of the nerve, exhibited the proper grayish red. Most of these patients were strikingly anæmic. In five of these fifteen cases there was goitre, and the large supply of blood going from the carotids into the thyroid gland abates materially the quantity furnished to the brain. In other cases the force of the intra-cranial circulation was weakened by heart-disease, such as stenosis of the aorta, dilatation of the ventricle, feeble contraction, etc. From these facts the author concludes that epilepsy results from anæmia of the brain. Loss of consciousness first takes place, then spasms, irritability, and perhaps maniacal seizures. This stage implies cerebral hyperæmia, which may become so great as to cause fatal sopor, as in case three. Now, while in the anæmic condition the optic nerve is pale, in the subsequent stage of cerebral hyperæmia it grows red. In a few patients the nerve was gray or even white—one was an old epileptic, and two had indications of cerebral atrophy.

Another symptom to which the authors call attention is the succulence of the retina. The glistening reflex which appears in young children, and in some robust adults, and especially the silvery elliptical areola which surrounds the bright red fovea centralis retinæ in such persons, is said to be due to the abundance of fluid in the tissue. The absence of this lustrous reflex indicates a lack of moisture, and in only ten cases was its presence seen. These were young, but decidedly anæmic; and this feature was in some noticed during the stage of reaction and consequent turgescence. It is stated to be characteristic of incurable epilepsy to find enlargement of the central retinal arteries, narrowing of the veins, and absence of retinal reflex. One patient examined *during an attack* exhibited slight enlargement of the arteries, extreme thinness of the veins, and disappearance of the retinal reflex. At previous inspections of this patient, the veins were moderately large; and one seems warranted therefore in putting the emptiness of the veins and collapse of the retina into close relation with the unconscious stage of the attack. A frequent repetition of this state leads to pigment maceration of the choroid. The retinal arteries and veins are found in various and usually opposite conditions; that is, arteries large and veins small, or arteries small and veins large—the former state indicates an obstinate and severe disease, the latter, belonging to the reactive period, has a relatively better prognosis. Where, as in some cases, both arteries and veins are large, the circulation is becoming healthier. Small arteries and small veins indicate anæmia with regressive metamorphosis.

Pulsation of the retinal veins is the symptom which this article makes most prominent. It can be caused in every eye by gentle pressure with the finger. The vein widens with the heart systole, which is the time of arterial diastole. Pressure on the eye hinders arterial circulation, and favors venous outflow. Every thing which abates the pressure on the internal carotid may give occasion to venous pulse. In the cases cited, this

may originate in general anæmia, or in some local cause which favors anæmia of the head. Whatever promotes venous outflow from the head increases cerebral anæmia, and therefore a deep inspiration makes a venous pulse stronger. When pressure on the eye puts an entire stop to the arterial circulation, the retina can no longer see—every thing becomes dark. The effects of prolonged pressure are well seen in glaucoma.

"Anæmia of the whole eyeball is seen in pallor of the papilla, anæmia of the retina in venous pulsation; increased pressure is shown in arterial pulsation."

Venous pulse did not occur in both eyes, in all the thirty-six cases; in twenty it was stronger, or present only in the left eye. No reason is assigned for this preponderance.

The conclusions of the paper are put into the following four statements:

1. Venous pulsation appears when, by pressure either from within or from without, the eye is made anæmic.

2. Anæmia of the eye, whose special manifestation is pallor of the papilla, may occur from general poverty of blood, or from imperfect filling of the internal carotid; from both causes a venous pulse may take place. Hence this phenomenon appears in epilepsy and kindred affections, which depend on cerebral anæmia.

3. Diminution of circulation impairs the nutrition and function of an organ. In slight degrees of brain-anæmia, patients suffer temporary obscurations of sight, giddiness, and loss of consciousness.

The more serious the anæmia, the greater the debility of the organ. The eye loses sight, the brain loses sensation, will, and thought. Nothing but a reëstablishment of the circulation can restore the organ to its function and prevent death.

4. Hence in anæmic persons we may find the papilla reddened, the retinal veins turgid, and the retinal tissue swollen. This is the hyperæmia which succeeds to the anæmic state. In slight degrees of this reaction we have pain, spasms, increased irritability, and excitement. In higher grades we have general convulsions, exaltations, hallucinations, and mania. The man is then insane.

56.—*The Simultaneous Occurrence of Aneurisms in the Retina, and Enlargements of the Small Arteries of the Brain.* By Dr. Henri Lionville. [Gazette des Hôpitaux, 36, 1870.]

The above lesions were noticed by Bouchard and Charcot in 1868, afterward by Bouchereau and Magnan, and another similar observation is now made by Lionville in the person of a woman, seventy-two years old, who died of apoplexy. The vessels of the brain were atheromatous, and innumerable miliary aneurisms were found in the vessels of the cerebrum, cerebellum, and meninges. In the retina, similar dilatations were found, from the size of a grain of powder to a large pin-head; the smallest required a magnifying power of ten to twenty times, to be seen by the naked eye. These lesions may be put alongside of retinal apoplexies, in their significance as to the state of the cerebral vessels. They have not yet been seen during life by the ophthalmoscope, but may perhaps be observed.

57.—*Two Cases of Embolus of the Arteria Centralis Retinæ.* By Dr. L. Grossman, Pesth. [Vierteljahrschrift für die praktische Heilkunde, Band ii., 1870, s. 94–100.]

58.—*Asthenopia and other Ocular Affections produced by Petroleum-Light.* By Prof. Cesare Paoli. [La Sperimentale, xxv., 2, p. 108, 3, p. 223, 1870, Schmidt's Jahrb., B. 147, 7, 432.]

Without quoting the theoretic reasons given for the alleged hurtful

effects of petroleum as a source of light, some of the cases may be repeated which are given in proof. All have the character of retinal hyperæsthesia. The first, a young French student who was thus attacked, is not so undeniably to be referred to this cause as to be received without hesitation. He simply had extreme intolerance of light, and impaired vision, how much impaired is not stated. By ophthalmoscope, the fundus appeared pale, the arteries and veins very thin, nerve normal. After two years the patient was in a measure restored, so as to read fifteen to twenty minutes at a time. His treatment consisted in iron, cold water to the eyes, gymnastics, sea-bathing, travelling, etc.

The second case or group of cases respects six girls who were accustomed to sew together in the winter evenings by a very bright petroleum-lamp. For two months none had any trouble, then two who worked the longest were attacked by severe asthenopia; they could fix upon a near object for only a few minutes at a time, and could not work at all in the evening. Two others were affected with similar retinal symptoms, though in a less degree; a fifth had conjunctival and retinal congestion, only one entirely escaped. The entire giving up of work by petroleum-light procured recovery after several months.

3. A student of mathematics, of delicate structure, worked at night by a large petroleum-lamp. After a time he found that he could not see as well as before, and added another lamp, until he became unable even to discern large objects—on a cloudy day he could not walk the street alone. The eyes were externally of normal appearance, the pupils a little enlarged—conjunctival vessels slightly varicose. The optic nerve was congested; the veins much distended, and the blood seemed as if coagulated in them; the arteries enlarged. By confinement for several weeks in a dark room, the patient was restored.

59.—*A Case of Retinitis Leucæmica*, by Dr. M. Roth. [Virchow's Archiv, Band 49, pp. 441–446.]

A man, aged fifty-five, died with marked sign of leucæmia, and his eyes had during life been examined by Prof. Schirmer with the ophthalmoscope. There was no impairment of sight, but still there was decided retinitis, with gray exudation, and a few apoplexies; the color of the eye ground and of the retinal veins was quite normal.

At the examination of the retina, *post mortem*, the exudation was found to be due to hypertrophy of the fibres of Müller in the external fibrous layer and their granular degeneration. At a few spots there were hypertrophied nerve-fibres. In the periphery and in the outer layers were numerous small extravasations. The choroid extremely hyperæmic; the large vessels charged with masses of white blood-corpuscles, the capillaries contain about equal parts of red and white blood-disks. Rods and cones well preserved. The vessels in the periphery of the retina had undergone fatty degeneration to a great extent. The lymphoid infiltration of the retina and chorid was precisely like the lymph-cells in the vessels, and a process of emigration was the most natural suggestion.

60.—*The Similarity between the Neuro-Retinitis produced by a Cerebral Tumor and by Bright's Disease.* By Dr. Herm. Schmidt and Dr. Wegner, Berlin. [Archiv f. Ophthal., Bd. xv., Abth. 111, s. 253–275.]

Two cases are fully detailed, which are of themselves highly important, but whose value is greatly enhanced by their comparison with each other. Both cases were fully observed during life, and the appearances, *post mortem*, were studied in a thorough and competent manner, The broad facts are that a girl, aged twenty-three, exhibited in both eyes the appearances

which belong to the most complete picture of Bright's disease, had no albumen or other evidence of kidney-trouble, and not until a short time before death had she any symptoms to cause suspicion of brain-trouble. The autopsy disclosed a tumor at and in the region of the septum lucidum. Another girl, aged fifteen, had the same ophthalmoscopic symptoms, with clear signs of Bright's disease, and, having died, gave opportunity for microscopic examination of the retina and optic nerves.

The features common to both cases, in the ophthalmoscopic picture, were great swelling of both optic nerves, redness and infiltration, edges indistinct, vessels swollen—in the case of tumor there was ecchymosis of one papilla; near the nerve, opaque white patches of the rounded form, and dotted edges, seen in nephritic retinitis; at the macula the usual radiating figure, extravasations of blood in various places. Both cases were as similar as two cases of the same disease could be, and were studied by Graefe and others.

In the tumor patient, the ocular lesion was confined strictly to the eye—the optic nerve-trunks, close up to the globes, possessed a normal structure as seen by the microscope. The lesions in the retinæ in both cases were extremely alike, making the diagnosis by the microscope almost as impossible as by the ophthalmoscope. There were in both cases sclerosis of the fibres of the optic-nerve layer—the ganglion cells atrophied or sclerosed—the granular layers studded with or almost transformed into fat granule-cells—hypertrophy of the connective tissue of the nerve and retina—blood-disks, and brownish pigment—the choroidal vessels were somewhat sclerosed. The only difference in the two cases was that, in the patient with cerebral tumor, the swelling of the retina belonged more to hypertrophy of the inner retinal layers and papilla, while in the patient with Bright's disease the swelling affected principally the radiating fibres of the external granular layer. In neither case could the rods and cones be well examined, because of cadaverous changes.

The amount of the matter is, that we cannot any longer assert the infallibility of diagnosticating Bright's disease by the ophthalmoscope. Many good observers have denied the possibility of mistake, and have recorded their opinion (*vide* Liebreich, Mauthner, etc.), but the rétinal pictures may be completely simulated by neuro-retinitis from cerebral tumor, and from diabetes mellitus. Graefe records a case of cerebral tumor producing the retinal lesions in question (Archiv f. Oph., B. xii., 2, 120), and states some minutiæ for differential diagnosis, but these points are renderd valueless by the two observations above recorded.

We are therefore compelled to examine the urine as well as the eye, and to study the signs of cerebral disturbance, however obscure they may in some cases be. But it remains true that the retinal lesions do belong in the large majority of instances to Bright's disease. A point to be studied is, what causes the neuro-retinitis in some cases of Bright's disease?—Can there be any analogy to the incarceration which belongs to the pathogenesis of the *Stanung's papilla* in neuritis descendens?

61.—*Acute Neuritis Optica from Tumor of the Brain—Autopsy.* By Dr. Schiess Gemuseus. [Monatsblätt. f. Augenheilkunde, viii., p. 100, April, 1870.]

A silk-dyer, forty-three years old, after a fit of anger, was seized in August, 1868, with heat in the head, mental excitement, and epileptic convulsions. His memory grew feeble, he had occasional headache, and toward the close of the year the epileptic attacks returned—his legs became weak, he fell into apathy, and complained of frontal pain. He would answer a question only after a long pause; there was slight ptosis of the left eye; hearing of the left ear had been defective for years, and he had had a blow

on this side of the head four years before. His eyes were examined in January, 1869, by the ophthalmoscope, although his vision was perfect. The examination, which was very troublesome, revealed in both eyes extreme œdema of the papilla and its surrounding parts, besides small extravasations. Soon after, the patient died. The section showed in the skull roughness of the inner surface of the bones, especially in the right middle fossa. The right hemisphere tense, the convolutions flattened, the falx pushed to the left side, the left ventricle enlarged, the right narrowed. A tumor grew from the apex of the right anterior lobe, reaching back to the limit of the posterior lobe, which proved to be a sarcoma partially softened, and with some recent and old apoplexies. The optic papillæ were elevated to a prominence of 1½ mm., the optic fibres in the retina were spread asunder by abundant growth of connective tissue—at the borders of the swelling were masses of fatty degeneration—there were no new vessels developed. There is no account of the state of the orbital portion of the optic nerve. This case adds to the observations already become numerous, where intracranial disease produces visible changes in the fundus oculi without causing injury to sight.

62.—*On the Mode of Occurrence of Neuritis Optica Intraocularis* (*Stanung's Papilla*) *in Cerebral Disease.* By Dr. HERM. SCHMIDT, Berlin. [Archiv für Ophthal., Bd. xv., Abth. 2, s. 193–197.]

In view of the anatomical fact stated above, and of the relations between the arachnoid cavity and the sheath of the optic nerve, to which Schwalbe has called attention, Dr. Schmidt attempted to discover how the head of the optic nerve becomes swollen from intra-cranial pressure. He removed a small piece of the skull and dura matter from an animal which was bled to death, and then injected a solution of Berlin blue, with slow and steady pressure, into the arachnoidal cavity. The coloring matter passed freely into the space between the outer and inner optic-nerve sheath, but never penetrated between the fibres of the nerve-trunk. When the nerve reached the globe the fluid was in greater quantity, but did not extend to the connective tissue about the sclera, nor into the space between the choroid and sclera. It did penetrate directly into the lamina cribrosa, making this tissue a deep and brilliant blue, but not coloring the head of the nerve. Thus a direct communication is proven between the arachnoidal cavity and the net-work of the lamina cribrosa, by which pressure of fluid may be conveyed, and in consequence the head of the nerve suffer strangulation, while the rest of the trunk may be unaffected.

In case the communication between the nerve-sheath and the arachnoid should, by a tumor or adhesive inflammation, or otherwise, be closed, we might have, instead of the œdematous papilla, simple atrophy of the nerve.

63.—*Case of Temporary Blindness, in a Young Man.* By Dr. J. HIRSCHBERG. [Med. Chir. Rundschau, Mai, 1870.]

A young man, eighteen years old, who had recently had gonorrhœa and afterward angina, became suddenly blind during the night of November 19th. For two days he had complained of severe headache, which was much worse on that night. His vision was reduced to mere perception of light; the pupils, of medium size, acted slowly in response to light. The optic nerve and fundus entirely normal. The urine contained a noticeable quantity of albumen. There were no other symptoms.

The artificial leech was twice applied to each temple, a decided purgative administered, and mercurial treatment begun. By the succeeding night the patient stated that he could see again, and on the following day vision was fully restored, and the pupils became again actively contractile.

64.—*Anæsthesia of the Retina.* By Dr. A. Sichel. [Annales d'Oculist., t. lxiii., Mai et Juin, 1870.]

Two cases are reported, the first elaborately and the second briefly. The author regards this condition of retinal anæsthesia as not due to want of perception in the special sense, but want of appreciation by the brain. The disease begins suddenly after some violent mental or moral impression. It attacks persons of a nervous or hysterical temperament. The eyes present no abnormal appearances either within or without. Sight ranges from moderate amblyopia to utter blindness. The visual field exhibits the greatest possible variety of form, as the accompanying cases show. Cutaneous anæsthesia and hyperæsthesia occur in various parts of the body. The disease is obstinate and wearisome, but usually ends in recovery. The most interesting case is the first, viz.:

A merchant, aged twenty-eight, very near-sighted, had an attack of blindness in the right eye in 1856, which lasted a year and a half; another attack in 1861, lasting eight months; and in the autumn of 1868 a third took place. While on a pleasure-excursion in the country, he was overcome by the extreme heat—the next day was taken with loss of consciousness, vomiting, and diarrhœa—five days afterward violent headache took place, quickly followed by injury to sight. The right eye totally blind, the left partially; reads Jaeger 1 at seven centimetres (less than three inches.) The left visual field notably contracted above and below. The next day the field had contracted inward and outward, and slightly expanded upward and downward. The remarkable and fantastic variations in this respect are indicated by no less than seventeen diagrams, taken during a period of nine months. For most of the time it was central and very small—for instance, in January it measured, at thirty-five centimetres' (about fourteen inches) distance from the point of fixation, less than three inches vertically, and a little less horizontally. The perception of color was defective; sometimes he would recognize only yellow, and all other tints would appear green; again, he would call carmine orange, at other times all deep tints appeared black, and light ones gray. In snow light he saw prismatic colors, blue, red, etc. There was anæsthesia of the skin of the knees, the elbows, and of the right lumbar region: and hyperæsthesia in the right orbital region, in the left lumbar region and shoulder; sometimes the pain in the right orbit was exquisite, and accompanied by most severe photophobia. At a later period there were insomnia, loss of memory, perversion of all sensorial functions, extreme sexual propensity. The case was seen by Prof. Graefe, who agreed with the diagnosis of retinal anæsthesia. The treatment consisted in the use of tonics and nervines, hydrotherapeutics, change of scene, fresh air, abundant exercise; the oxide of zinc was tried, at Graefe's suggestion, half a grain to two grains, three times a day. Finally, the patient recovered perfect sight and health. The intra-ocular symptoms were negative, except pallor of the nerve.

A second case, in a young woman twenty-six years old, presented features similar to the above, and recovered in three months.

65.—*On Color-blindness in Diseases of the Eye, and Remarks on Certain Forms of Amblyopia.* By Dr. Th. Leber. [Achiv für Ophth., Bd. xv., Abth. iii., s. 26–107.]

The ability to discern colors is injured in various affections of the eye, and has been a matter of attention by many observers, but we yet do not possess exact information on its relation either to the healthy or morbid states of the organ of sight. The most common cases in which this defect appears are those of atrophy of the optic nerve. Dr. Leber has investigated thirty-six cases of this kind, all of which had amblyopia and limitation of the

visual field, and in all but three there were anomalies in the perception of color. This defect occurs under every form of nerve-atrophy, the simple, the inflammatory, and the glaucomatous, as well as in every degree of amblyopia. Even where sight is not much injured, color-blindness may be very marked. The prognosis of the nerve-affection is not modified for better or for worse, by the loss of color-perception. The color to which patients are most frequently insensitive is red, while blue is best preserved: green appears yellowish or gray; rose and violet, bluish; yellow commonly appears yellow. In the later stages of the malady only the bluish shades are apt to be recognized, all others appearing whitish, gray, or dark. This corresponds closely with what is true of the normal eye during deep twilight.

In three cases of *hemiopia* there was no defect of color-perception in the sound half of the field. In one of these cases vision was nearly restored, but on the blinded side the color-sense remained defective. Quaglino and Boys de Loury published each a case of hemiopia in which there was absolute color-blindness for the remaining field.

An extremely interesting class of cases are those of amblyopia and central scotoma without ophthalmoscopic lesions. The amblyopia occurs without central scotoma; and in three cases there is little derangement of the perception of color. Out of twenty-one cases of amblyopia without scotoma, only three were unable to distinguish red. These patients acquire their amblyopia from abuse of alcohol, tobacco, and other toxic substances, a few from anæmia and mal-nutrition. The truth of this assertion appears from the fact that, out of eighty-one cases of amblyopia, in which there were no ophthalmoscopic lesions and no central scotoma, there were seventy-five men and six women.

But cases of amblyopia without visible lesion, but with central scotoma, present marked impairment of sense of color. At an early stage of these cases is to be found sometimes a faint, striated haziness of the border of the papilla and neighboring retina, which resembles syphilitic retinitis, but, unlike the latter, extends only a little distance into the retina. Twice there were evidences of diffused retinitis; in several cases there were isolated hæmorrhages; but generally no changes could be seen by the ophthalmoscope. At a later period the papilla is apt to show alteration of tissue in pallor or slight bluishness of its outer half—a sign of partial atrophy at least in some of the cases. Of this class of cases fifty-six were seen, and in thirty-one the perception of color tested; of which in all there was a discernible impairment. So uniform was this fact that it may be taken as a means of diagnosis of the existence of central scotoma. The cases may be subdivided into several categories: 1. Central scotoma not demonstrable by the usual test, but only by the loss of color-perception, while the periphery of the retina is able to recognize colors—eight cases. 2. Scotoma may be determined in the usual way, and only within its limits is the sense of color impaired, while in the periphery the sense of color continues—nine cases. 3. In the scotoma there is absolutely no perception of color, and in the periphery there is a slight impairment, while eccentric vision is perfectly good—fourteen cases. 4. Another set of cases not coming under the class we are considering are those which have, in addition, impairment of eccentric vision, and which pass over into nerve-atrophy; of these there were three, and were not included in the above thirty-one. These several categories are not to be sharply defined, but shade into each other, and often advance from one to another. For example, a scotoma which at one period was only to be made out by the color-test, may afterward be manifest to ordinary examination. The third class are usually the most unsatisfactory, and belong to an advanced stage of the disease, when prognosis is unpleasant.

A peculiar form of amblyopia is that in which there is central scotoma, outside of it, a zone of nearly normal perception and the periphery affected by color-blindness. A case of this condition in both eyes is given; but the patient did not remain for treatment.

Central scotoma generally affects both eyes, though to unequal degrees, and simultaneously. It is a disease of men almost exclusively—there have been but three women to fifty-three men. It affects those above twenty years of age, and increases in frequency to forty years. Abuse of alcoholic drink and of tobacco-smoking are often to be assigned as causes, while exposure to cold and wet also have a part. In one case there was syphilis, and in another it was also the probable cause.

There are strong reasons for believing that the seat of the disease is not in the retina nor the brain, but in the trunk of the optic nerve between the chiasm and the globe, and that it is a veritable neuritis. This is not to be asserted of all cases, such as amblyopia potatorum, where hyperæmia and nutritive disturbance of the nerve-elements are to be supposed. In the case of neuritis it is to be assumed that only a part of the nerve is inflamed or atrophied. There are anatomical and pathological reasons for the assertion that the fibres which go to the rods and cones at the macula lutea are situated on the superficial parts of the nerve-trunk and those which belong to the periphery lie nearer the centre of the nerve. A perineuritis would, therefore, explain the symptom of central scotoma.

The results of treatment are always much less favorable in amblyopia with central scotoma, than in amblyopia without scotoma. If the color-blindness reach to the periphery of the field, and the nerve show manifest signs of atrophy, treatment will be almost fruitless. The therapeutics must be suited to the state of the individual, but in general they are blood-letting, sudorifics, purgatives, and tonics. In some cases iodide of potassium in small doses has proved of unexpected value after other things had been tried in vain. The scotoma in amblyopia potatorum is more obstinate than in other cases. Entire blindness is not to be feared in even bad cases, if the visual field remain perfectly free for a long time.

A disease wholly differing from the above is acquired color-blindness without amblyopia. Such cases have been described in literature before the use of the ophthalmoscope by Wartmann, Ruete, Mackenzie, Tyndall, and others. One case has fallen under my own notice, in a merchant, twenty-one years old, who was employed by a silk manufacturing firm, and discovered that in a brief time his power of discerning shades of color was abolished. He called light-green, yellow; dark-gray violet, red; scarlet and brown, green; red, gray; while some tints of green, blue, and yellow, he gave correctly. Visual acuteness normal, fundus normal, rather darkly pigmented. A second examination, two years later, gave almost the same results. The color-blindness embraced the whole field; there was no scotoma whatever; could read Jaeger from four seconds to one minute fluently. Probably the seat of the disease was in the brain.

66.—*Tumors of the Retina.* By Dr. EDWARD DELAFIELD, New York. [Trans. of Am. Oph. Soc. for 1870.]

In this paper, which gives the results of a careful study of five cases of intra-ocular tumors, the author endeavors to discover the exact point in the retina from which gliomatous tumors spring, and the relation between the elements of the retina and of the tumors. After rehearsing the views which have been held, he proceeds with the detail of the cases. He finds, it may be said in parenthesis, five cases of cure by operation—that is, the disease had not recurred within periods varying from one to six years.

Conclusions derived are that the elements of these tumors, when not

changed by preservative fluids, do not correspond to the normal elements of the retina, but to those of connective-tissue cellular new growths; that these new growths having the character of permanent new growths, the shape and arrangement of their elements correspond exactly to those of the round-celled, medullary sarcomata of other regions. The final conclusion is that, since these tumors correspond closely to the definition which Virchow gives of sarcomata, they ought properly to be classed among these, and may be distinguished by the special name of glio-sarcoma.

67.—*A Case of Retinal Glioma operated on at a very early Period, and showing some New and Peculiar Anatomical Conditions.* By Dr. H. Knapp, New York. [Trans. of Am. Oph. Soc., 1870, pp. 84–86.]

The growth took origin at the anterior part of the retina, developing from the inner granular layer, and, as it increased, it detached the retina, and finally became enveloped or invaginated in it.

68.—*A Case of Supposed Glioma.* [Trans. Am. Oph. Soc., 1870.]

An infant, five months old, in whose eyes the father had noticed at birth a yellowish reflex, who at two months had an attack of inflammation, leaving a little opacity in one cornea—at the time of examination totally blind in both eyes. In both eyes there had been iritis; in one the pupil contracted; irides pushed forward; a yellow reflex in the interior of both eyes; in the one what appeared to be a tumor, with nodular surface, and some vessels. A number of good observers regarded the disease as glioma: and both eyes were extirpated.

The notes say nothing about the state of tension of the globes—a fact of some value.

On anatomical examination, no glioma found; simply the results of general internal inflammation; retina totally detached; behind it a thick reddish fluid, and a firm brownish mass, composed of shrivelled blood-globules and granular matter; choroid in place—much of its epithelium hypertrophied.

A case worth remembering, and a mistake of diagnosis which others have made (Graefe, in 1859, committed the same error, as we were witnesses). The harm done by operating was not serious, but it was an unpleasant thing certainly.

69.—*Rough Notes of a Case of Glio-sarcoma.* By B. J. Jeffries, M. D., Boston. [Trans. Am. Oph. Soc., 1870.]

The subject was a healthy man, aged twenty-seven. The tumor had come through the sclera, and infected the optic nerve, but did not occupy the interior of the globe. It was seated principally in the superior and internal recti muscles, while the ciliary body and choroid were infiltrated with the disease. The retina adherent, but not thickened. The microscopic elements were the rounded glioma-cells in the optic nerve and muscles, and, in the choroid, spindle-shaped cells.

70.—*The Diagnosis of Intra-ocular Sarcomata.* By Dr. Otto Becker, of Heidelberg. [Archives of Oph. and Otol., vol. i., part ii., pp. 694–715.]

In this highly-interesting paper seven cases are described. In three, a small tumor was detected at the region of the macula lutea, and in two the retina was not detached; in the other, vitreous opacities made it difficult to decide upon the position of the retina. In a fourth and fifth case, a tumor grew from the inner and outer side of the fundus; in a sixth, and in a seventh also, from the outer side. In the fourth, fifth, and sixth, the retina was in contact with the surface of the tumor, but, near its base,

was a little detached; but the tumor had a pedunculated, gourd-like shape, and this alone Dr. Becker deems sufficient to fix the diagnosis of choroidal sarcoma as against sub-retinal effusion. The diagnosis between these two conditions is or is not to be made out, Dr. Becker thinks, according to the situation of the choroidal sarcoma. If it originate from the ciliary body, Dr. Knapp showed that it does not or may not cause any sub-retinal effusion. If at the region of the macula lutea, they show less disposition to grow into the interior of the eye, as the first three cases demonstrated, but pushed through the sclera, and developed largely in the orbit.

When the tumor within the eye is larger, its appearance varies according to its situation on the upper, lower, or lateral parts of the globe. In these cases the retina is usually to some degree detached. If the tumor be below, the retina will lie in contact with its summit, and spread out on all sides in a broad detachment. As the tumor grows and adheres to the retina, if vessels are perceived in the neoplasm, it may be diagnosticated, but otherwise it will be likely to escape notice. If the tumor be growing from above, the detached retina will hang down like a pouch, and no detachment be visible at the base. If the growth spring from the lateral wall, the retina never fails to become somewhat detached about its base. Sometimes the outline of the tumor can be traced through the detached retina; this depends on the depth of the superjacent fluid.

Another point deserving special mention is, that as a sarcoma grows it exhibits a vascular net-work on its surface, and these vessels grow rapidly. They may at first be faint, and afterward strongly marked. Two well-executed chromos illustrate one of the cases.

For the examination of the tumors which reach forward to the middle of the eye, Dr. Becker suggests that the highest magnifying power is gained by holding a strong convex lens close to the eye, and the mirror as near to and behind it as may be consistent with proper illumination.

71.—*An Atrophied Globe which contained a Choroidal Sarcoma partly softened and partly ossified.* By Dr. H. Berthold. [Klinische Monatsblät. für Augen., January, 1870, s. 19–24.]

MISCELLANEOUS.

72.—*Investigations into the Lymphatics of the Eye, and their Distribution.* By Dr. G. Schwalbe. [Archiv f. Mikroskop. Anat., Bd. vi., pp. 1–61; also Bd. vi., pp. 261–362. Monatsblät. f. Augen., April, 1870, 117, July, August, 1870, 227.]

This investigation has been conducted with the utmost labor and completeness. The lymphatic circulation of the eye is divisible into an anterior and posterior region. To the latter belong the perivascular spaces of the retina, the perichoroidal space with its outlets, and the space between the outer and inner optic nerve-sheath, which does not communicate with the other two systems, but directly with the arachnoid cavity. The tissue between the choroid and sclera, which was formerly called lamina fusca, and afterward considered unworthy of designation as a special membrane, again assumes its former dignity as a serous *sac*, and is called by Schwalbe the supra-choroidea. In it he finds an endothelium. It consists of elastic fibres, flat cells, and nuclei. It appears only in eyes of adults, and in later years, under the influence, it is believed, of the accommodation. The space within this membrane reaches forwards to the ciliary processes and back to the nerve-sheath. It does not connect with the lymph-vessels in the stroma of the choroid. Neither has it any communication with the anterior chamber. But it does communicate with the surface of the globe, that is, with the space beneath the capsule of Tenon, at the four orifices by which

the venæ vorticosæ emerge from the bulb. The outlet of the supra-choroidal lymph-space is therefore a perivascular one.

Within the capsule of Tenon, too, there is a lymph-space where the characteristic endothelium may easily be recognized. After hardening by Müller's fluid, a delicate membrane with elliptical nuclei may be taken from the exterior of the sclera, and it is entirely similar to the supra-choroidal endothelium. An attempt to push an injection from the cavity of the capsule in other directions did not succeed, but, by beginning in the cavity of the arachnoid, not only was the cavity of the capsule of Tenon injected, but also the lymphatic vessels and glands of the neck, by which complete proof was afforded that the perichoroidal and Tenonian cavities are true lymph-spaces.

It is also shown that the space between the two sheaths of the optic nerve is a lymph-cavity, and opens directly into the arachnoid, while it also communicates with the lymphatics of the neck. It has an endothelium. This space does not connect with the cavity of the capsule of Tenon, which is supra-vaginal, nor with the perichoroidal cavity, although the injection comes very close to it, at the entrance of the nerve into the eye.

In a second part of the above paper, the lymphatic circulation of the anterior part of the eye is considered. It is impossible to condense the hundred pages of this description into the limited space we can occupy, and do justice to the laborious investigations of the author.

First, is studied the anterior chamber and its outlets; second, the canal of Petit, and the ciliary zonula. By injection of Berlin blue into the anterior chamber under a pressure of thirty to fifty mm. of mercury, soon a blue ring appears in the vicinity of the border of the cornea and the surface of the sclera, from which anastomosing vessels run in various directions. By careful study it was shown that the vessels thus injected were not perivascular lymphatics, but veins, which are in open communication with the anterior chamber.

The relations and surroundings of the canal of Fontana, the pillars of the iris (ligamentum pectinatum), and the canal of Schlemm, are then taken up, with the view of more particularly learning how fluid injected into the anterior chamber finds its way into the veins. He finds the ligamentum pectinatum, the canal of Fontana, which lies more peripherally, and the canal of Schlemm, to be distinct structures, although in close contiguity. The inner wall of the canal of Schlemm is made by a prolongation of the membrane of Descemet, and from the inner surface of this wall, which is freely fenestrated, spring the septa and fibres which compose the net-work of the canal of Fontana. The openings in the walls of these canals have their long axes parallel to the equator of the eye. The outer wall of the canal of Schlemm is made by the sclera, and from its posterior angle the ciliary muscle originates. The author does not agree with Leber, that it is only a venous sinus, or part of the ciliary plexus—he states that the ciliary plexus of Leber is a wholly different thing. The canal has an endothelium of a peculiar reticulated appearance. From the above it is plain how fluid may pass from the anterior chamber into the canal of Schlemm, and may reach the blood-vessels, because numerous veins open directly in the canal. Under ordinary circumstances the canal is a lymph-vessel, but by an excess of pressure in the blood-vessels it may be filled with blood. It is not part of the ciliary plexus, but connects with it by a few venous twigs; and these twigs may, under different circumstances, carry blood or lymph. If the tension in the anterior chamber be diminished by paracentesis, an injection into the arteries easily passes into the anterior chamber, but, with the usual equilibrium, this cannot occur.

The canal of Petit is also capable of being filled by injection from the anterior chamber. To account for this, there were found five fissural

openings in the anterior wall, close to the border of the lens, and *vice versa*, by these, the anterior chamber may be filled from the canal. But the canal cannot be injected from the vitreous chamber, which shows that the posterior wall is entire.

It is thus shown that the anterior chamber, the posterior chamber, and the canal of Petit, constitute a continuous lymph-space. Most of this fluid comes from the vessels of the iris and ciliary body, through the reticulations of the canal of Fontana into the anterior chamber. The outlets of the latter are the ciliary veins, through the canal of Schlemm. Pressure in the part of the eye behind the lens causes a partial escape of the aqueous humor through the veins. This was proven by direct experiment with colored fluid injection. The slow increase of pressure which takes place in glaucoma is well known to have this effect, and how the shallowness of the anterior chamber occurs may thus be understood.

We are tempted to conclude our *résumé* by a quotation of the concluding pages which relate to the changes that take place in accommodation, but any thing less than complete rendering would be unsatisfactory, while our space is already occupied.

73.—*Statistics of Operations in Dr. Wecker's Clinique, Paris, for* 1869. [Schmidt's Jahrbuch, No. 5, 1870, s. 190.]

Cataract extractions by peripheral linear section...... 109.

Of these—

69 read Snellen No. 1 — vision $= \frac{1}{2}$ to 1.
10 " " No. 1 — " $= \frac{2}{5}$.
7 " " Nos. 3 and 4.
2 " " No. 5.
16 could count fingers at 20 feet.
5 were failures.

Prolapse of vitreous at the operation happened ..	6	times.
Discissions..................................	2	"
Iridectomy—for artificial pupil.................	13	"
" as therapeutic operation...........	117	"
Strabismus operations........................	90	"
Puncture of detached retina..................	12	"
Enucleation.................................	5	"

In only one of the six patients on whom the puncture of detached retina was performed did useful results follow. In three cases Wecker performed an operation first suggested by himself—the tattooing of leucoma of the cornea, to conceal or remove the unsightliness of its appearance—and with satisfactory result.

74.—*Description of a New Exophthalmometer.* By Dr. Emil Emmert.

Another New Exophthalmometer. By Dr. W. Zehender. [Klinische Monatsblät. für Augen., February, 1870.]

Of the two instruments above described for measuring the degree of prominence of the globe, that of Dr. Zehender appears to be the more simple, and to be both accurate and easily available. We must refer to the articles for adequate description.

75.—*A New Iris-Forceps.* By Dr. Liebreich. [Monatsblät. für Augen., June, 1870, p. 183.]

Our report has become so lengthy that we may not venture to present any thing of the last number of the Archives for Ophthalmology (Bd. xvi., Abth. i.)

But we cannot forbear alluding to the sad announcement which, with emblems of mourning, its first page makes of the death of Prof. Graefe, on the night of July 20, 1870. The scientific world suffered a heavy loss—to ophthalmic science there could be no loss so heavy. So genial was his temper and so brilliant his gifts, so unwearied and energetic his labors, that both young and old accorded him the highest place in ophthalmic surgery. The debt which humanity owes to him, in what he did personally and through those whom he taught and stimulated both by word and pen, will never be fully estimated. The editors of the Archives, Profs. Arlt and Donders, announce their purpose to continue the journal, and close their tribute to his memory with the words—

"*Amicissime, requiescas in pace.*"

BOOKS AND PAMPHLETS.

Pathologie Iconographique du fond de l'Œil—traité d'Ophthalmoscopie—par A. de Montmeja. Paris, 1870. The chromo-lithographs are crudely done.

Atlas d'Ophthalmoscopie et d'Optomètrie, par M. Maurice Perrin.

Traité pratique d'Ophthalmoscopie et d'Optomètrie, par M. Maurice Perrin. Paris, 1870.

A work of considerable merit. The plates are small, and not finished in the highest degree, but have real value.

Atlas d'Ophthalmoscopie, par R. Liebreich. 2me edition. Paris, 1870.

This second edition of a classical work has been modified in important respects by adding new plates, as well as substituting some in place of others. It is to be presented in an English dress by Messrs. Churchill, of London. It will be gladly received.

Ueber das Verhalten der Doppelbilder bei Augenmuskeln-lähmungen von Dr. M. Woinow. Wien, 1870.

This is a series of tables indicating the appearances of double images in all possible cases of paralysis of ocular muscles, and is eminently instructive.

Ein Wort zür Erinnerung an Albrecht von Graefe, von Prof. Alfred Graefe. Halle, 1870.

A eulogium on Prof. Graefe by his cousin.

Die Augendiätetik oder die Kunst des Schvermögen zu erhalten und zu verbessern von Dr. J. Ch. Jüngken. Berlin, 1870.

Die Ophthalmia militaris sive granulosa von modernen Standpunkte, von Dr. Max Peltzer. Berlin, 1870.

Traité des Opérations qui se pratiquent sur l'Œil, par E. Meyer et A. de Montmeja. Premier partie. Paris, 1870. Accompagné d'un Atlas photographique.

Miscellaneous and Scientific Notes.

The large amount of matter on hand and accumulated in type compels us to omit all our Bibliographical and Literary Notes, as well as a portion of the Proceedings of Societies.

New York Academy of Medicine.—At the annual meeting, held January 5, 1871, the following-named officers were elected: President, Edmund R. Peaslee, M. D.; Vice-President, Austin Flint, Sr., M. D.; Recording Secretary, William T. White, M. D.; Corresponding Secretary, John G. Adams, M. D.; Treasurer, James O. Pond, M. D. Five hundred dollars were, on the motion of the Treasurer, added to the building-fund. This fund now amounts to some twelve thousand dollars, and the prospects of securing a permanent habitation for the Academy are rapidly and steadily advancing.

Blandensville, Ill., *November* 14, 1870.

Editor of the New York Medical Journal.

Dear Sir: Having read many interesting articles in the Journal on the subject of croup, and having had considerable experience in treating the disease (though not to the extent nor with the success claimed by Prof. Barker), I desire to lay before the readers of the Journal very briefly a somewhat different and (since instituting it) entirely successful course of treatment of this much-dreaded malady.

I wish to say, first, that I endorse fully Dr. Fabius in reference to emetics, although I have never tried turpeth mineral, so highly recommended by Prof. Barker.

"The effect derived from emetics is purely mechanical," and, I think from experience I may add, not to be depended upon as at all curative; and further, if the proper course is pursued, that mechanical means of a therapeutic or surgical character are seldom, if ever, required.

I believe, with Prof. Barker, that "the difference between true and false croup is *essentially* a question of intensity and extent of tissue involved," and that many cases of the less intense kind will under almost any rational treatment recover; while in the most severe cases the treatment usually prescribed and followed results unfavorably; in fact, I do not recollect a single case of the kind during my first ten-years' practice that did not prove fatal.

Seven years ago I made a radical change in the treatment, since which time I have not lost a single case.

The great and all-important question to consider is how to arrest the fibro-albuminous secretions, rather than how to get rid of them, and I think we have the constitutional remedies, in *tincture of iron* and *sulphate of quinine*, the local by cold, and sometimes very cold, applications to the throat, and warmth to the feet.

My usual course is to prescribe the following:

℞. Quiniæ sulphatis grs. xv.
Tinct. ferri muriatis ʒ iii.
Aquæ ℥ jss.

M. et signa. A teaspoonful every one, two, or three hours, as symptoms may require.

Apply cold compress to the throat, covered by dry flannel. I have at times used ice-bags for a while. Of course, much depends upon the judgment of the practitioner, as to strength of the medicine, and also as to frequency of change of the com press; age and condition of the patient, etc., to be considered. I will add that I have but little use for veratrum in this or any other disease, not having employed it for several years.

Respectfully, etc.,

G. F. Durant, M. D.

Buffalo, N. Y., *November* 16, 1870.

Editor of the New York Medical Journal.

Dear Sir: I notice in the November number of the Journal an abstract of an opinion of Dr. Almès, confirmatory of the opinions of other French physicians, in regard to the "effect of corrosive sublimate in improving the constitution," Dr. Almès having used the remedy with particularly good effect in many cases of children.

These views coincide with my own observation in the use of corrosive sublimate. I have, for years past, used it in cases of cachexia in children, particularly where there were existing chronic indurations or hypertrophies of the lymphatic glands, with the most satisfactory results.

I have, more especially, found it to produce its best effects in ulcerations of the cornea of children—cases, indeed, which would answer to the "scrofulous ophthalmia" of the text-books.

In a large number of cases of the above class, to which I have exhibited corrosive sublimate, recovery has been prompt and satisfactory, all of the evidences of the strumous habit rapidly disappearing; and in the cases of ulceration of the cornea a rapid and satisfactory cure of the local affection, as

well as a speedy return to general good health, and even robustness—getting far better effects in cases of this class than when trusting to the ferruginous tonics, wine, and cod-liver oil alone.

Respectfully,

WM. R. VAN HOOK, M. D.

DR. SNOW, the city registrar of Providence, R. I., says, in his last health report, the population, number of deaths, and proportion of deaths to population, were as follows:

Year.	Population.	Deaths.	Deaths to Population.
1867	56,825	960	One in 59.19
1868	64,140	1,110	One in 57.78
1869	66,524	1,256	One in 52.96
1870	68,906	1,263	One in 54.56

We venture the opinion that the rate of mortality in Providence, as shown above, is less than can be shown in any other city of equal, or of greater size, in this country, unless, *as is sometimes the case*, imperfect returns of deaths are compared with exaggerated estimates of population. In Providence, the returns of deaths, as given, are complete probably without exception, and the population given is according to the official census.

Tinea Favosa. — Dr. J. Peyritsch, in the *Medicinische Jahresbericht*, quoted in the *Lyon Médical*, says: "We know that tinea favosa is produced by a fungus, the *achorion Schœnleinii* (Remak), and that some experiments of M. Hallier would tend to connect this cryptogam with a series of very different forms which would comprise the *penicillum glaucum*, the *aspergillus glaucus*, the *mucor racemosus*, the *oidium lactis*," etc. M. Peyritsch placed sometimes the spores of favus, sometimes those of these other fungi, upon the skin of a man or of a dog. They were kept in place either with demi-cataplasms, or were inoculated with needles. He has never seen the favus grow, except from the achorion itself, and he has also ascertained that the inoculation, or application of the fungi, did not furnish any result. Besides, the experiments of cultivation, made upon several substrata, have sometimes given him the penicillum glaucum, the aspergillus glaucus, and the mucor racemosus; he believes, however, that his researches prove the specificity of the favus, and that the experiments of cultivation may have been imperfect, since no connection is established by

science between these fungi. We cannot analyze the interesting observations he has made upon the mode of apparition of the favus pustules. The action of the *achorion* upon the skin may be compared to that of a sinapism or of an irritating plaster.

Sympathetic Nervous Troubles from the Presence of a Tenia.— Two cases, mentioned by Dr. Maurin (in *Sud Médical*, No. 5, 1870, and *Lyon Médical*, April 24, 1870), are interesting in this, that they might have given rise to a diagnosis of troubles of the nervous centres.

The first patient was a clerk, aged forty-two, who for fourteen months had experienced more and more serious illnesses. At first he suffered from dull pains in the epigastrium; these pains after a while took on the character of an intense gastralgia, with inexplicable remissions and exacerbations.

A few months afterward he had some vertigo complicating the gastric pain. Finally, for eighteen months past, the gastralgia has yielded, but has been followed by a continued sensation of vertigo, a fixed pain in the nape of the neck and between the shoulders; sensation of falling forward when the patient walks up or down any incline; sensation of a soft body, like a cushion, under the feet during the walk; fear of an imminent death; sudden inclination to commit suicide.

The second patient was a physician, who experienced all the symptoms of a cerebral congestion; cephalalgia, troubles of the intellect, incomplete amnesia, impediment of speech; the patient, being gouty, had fear of a metastasis; but a few articulations of tenia having been passed, the diagnosis was made, and, as in the preceding case, a dose of kousso, by producing the expulsion of a tenia, caused at the same time all the symptoms to disappear.

In the *Medical Record* of January 2, 1871, Dr. E. Seguin describes a new clinical thermometer, which is intended for use on the surface of the body. The bulb is hemispherical in shape, the flat plane being admirably adapted for application to any portion of the surface of the body. The instrument is manufactured by Tiemann & Co., of this city.

Ligature of the Prepuce for Incontinence of Urine.—Dr. Espagne (*Montpellier Médical*, July, 1870, and *Lyon Médical*, August 14th) advises ligation of the prepuce for that kind of incontinence of urine called essential or idiopathic, to which also the name of *enuresia* has been given. At night, when going to

bed, the prepuce is drawn in front of the glans, and tied with a simple knot, by means of a piece of linen tape. The moderate constriction afforded by a tie having so large a surface, compared to the organ it embraces, can produce neither pain nor strangulation, nor the beginning of section.

This mode of preputial deligation is quite sufficient. However, the author has had made a small leather band lined with buck-skin, from ten to eighteen centimetres in length, and six to eight centimetres in width, according to the age of the patient.

The advantage of this *serre nœud* is an easier and more speedy application.

It would seem that urine ought to pass through the urethra and to distend the preputial cavity formed by the ligature before the patient awakes. This, however, is very rare—the patient awakes before micturition has commenced; thus the bladder is strengthened, and the apparatus may very soon be laid aside. Usually, when the enuresis is not very intense, the apparatus need not be put on before the midnight micturition, and, while the improvement continues, it may happen that the patient can retain his urine during the whole night.

The ligation of the prepuce deserves to be tried against enuresia; it seems to act in the same way as the occlusion of the preputial orifice with collodion, as recommended by Sir Dominic Corrigan, but it is more simple. It is preferable to all the means proposed with the object of compressing the perinæum, or the intra-pelvic portion of the urethra.

London Hospital Pharmacy One Hundred and Twenty Years ago. —In a "Short History of Old St. Thomas's Hospital," by Dr. W. H. Stone, prefixed to the New Series of St. Thomas's Hospital Reports, there are some curious extracts from "The Physical Vade Mecum, or Fifth Gift of *Theophilus Philanthropos*, wherein is contained the Dispensatory of *St. Thomas's* Hospital, with a Catalogue of the Diseases, and the Method of their cure prescribed in the said Hospital."[1] In the frontispiece of this curious work a fourfold conversation is supposed to be in course between a Patient and Doctor, Death, and the Deity. The remarks of each issue from their mouths in the form of labels. A coffin and skeleton in the foreground serve as emblems of mortality, and the doctor, after humbly asking

[1] This is dated from the shop of E. Duncomb, in Duck Lane, Little Britain, 1741.

and recieving the Divine permission, gives the following opinion and prescription, which is seen on a scroll at his left hand:

> From Infection sprung, it is a Fever strong,
> Unless with present speed a vein be open,
> Thou must die or bleed—
> V. S. ad ℥ ix. statim
> Episp. Nuchæ quam primum.
>
> ℞ Bol. Alex. ℈j, cum
> Nitri. gr. xij, 6 tâ quâque horâ sumend.
> Jul. Card.

In the part containing the Pharmacopœia or Dispensatory of St. Thomas's Hospital, it is stated that certain recipes are taken from a printed copy of the hospital, bearing date 1718, others from the old manuscript dispensations of the hospital. Many of them are sufficiently strange. For instance, to make Aqua Limacum, or snail-water, we are to take:

> "℞ Garden Snails, cleaned and bruised, 6 gallons;
> Earthworms, washed and bruised, 3 gallons;
> Common Wormwood, Ground Ivy, and Cardmus, each ℔ ½;
> Penny royal, Juniper berries, Fennel seeds, Aniseed, each ℔ ½;
> Cloves and Cubebs, bruised, each oz. 3;
> Spirit of Wine and Spring water, each 8 gallons.
> Digest them together for 24 hours, and then draw off in a common alembick."

This preparation, the author states, "is admirably well contrived, both for Cheapness and Efficacy; and for persons whose Circumstances and Manner of Living have not habituated them to any Delicacies, it is as good a Snail-water as can be made."

The calomel bolus contains twenty grains for a dose, being "the common Bole for Salivation." The turbith bolus has five grains of that drug with three grains of tartar-emetic. "N. B.—In the working of this Vomit it is needful to drink plentifully of Cardmus Tea, through defect of which, I knew one that Died."

"A Viperian Bolus" contains "ʒss. of the Flesh of Vipers in powder," taken twice a day.

"Sir Walter Raleigh's Confection" is composed of hartshorn, vipers' hearts and livers, and thirty-eight other vegetable

ingredients, made into a tincture, evaporated to an extract. The magma is to be pressed and burned; from the lixivium a pure salt is to be extracted and added to the extract; afterward into the mixture are to be stirred:

"Of Oriental and Occidental Benzoar, āā ℥ iss;
Of Oriental Pearls, ℥ iij;
Of Coral, ℥ iij;
Of Oriental Bole, Terra Sigillata, and Calcined Hartshorne, each ℥ j;
Of Ambergrease, ℥ j;
Of Oriental Musk, ℥ iss;
Of White Sugar Candy, ℔ ij."

Andromachus's electuary ("commonly called Venice Treacle") contains sixty-four ingredients, including viper's flesh and opium. The "Expressio Millepedum, or Expression of Wood Lice," has ℥ iij. of lice in spirit and water."

For a common salivating powder we have red precipitate, over which rectified spirit of wine has been burned. "The burning of the Precipitate in this manner breaks off the Points of those Salts which join to the Mercury in its Preparation, and makes it operate with greater Mildness, it being hardly safe in inward use without such Correction. And with this Salivations are frequently raised by giving 10 grains for a dose."

There is a "Powder for diseased Eyes," consisting of "Glass, what Quantity you please," well levigated. "It was used to clear the Eye of Specks which cloud the Sight, by blowing through a Quill some of the Powder upon the Parts affected, though it is not often used."

A powder of nitre, sulphur, and charcoal, is given as useful either for dropsies or for gums, though stated to be somewhat uncertain in the former.

The Tinctura Veneris of Boerhaave is a diuretic of such power that "By the Help of this alone I formerly cured a perfect *Ascites;* such a prodigious Discharge of Urine being excited, that it ran as out of an open Cock, upon which the Integuments of the *Abdomen* became so loose that they might be wrapped over one another. The Patient grew perfectly well, and enjoyed a good State of Health many Years after."

Under the use of mercurial ointment "some spit plentifully,

viz., 5, 6, or 7 Pints in 24 Hours; with others it passes off more by Sweat and Urine than by the Mouth; which things must be observed in regard to the Patient's Welfare."

The gem of the collection is the "Infusio Pleuritica," or pleuritic infusion. "Take fresh Horse Dung ℥ vj, Penni royal Water ℥ xij, Treacle Water ℥ iv, infuse them warm, and to the strained Liquor add Mithridate ʒ ij, White Sugar a sufficient Quantity to sweeten it; drink half a Pint twice a day." The author adds: "This is a very Good Medicine; if the dose here mentioned be too noisome, it may be lessened and repeated the oftener."

A reactionary movement may yet bring us back to the "Infusio Pleuritica." Who knows? The last edition (1868) of the Paris Codex contains quite as many polypharmacic preparations, a number of which are fully as absurd.

Physiological Action of Coca.—Dr. Isaac Ott contributes to the *Medical Times* (Philadelphia) the results of some interesting experiments which he made upon himself, for the purpose of determining the effect of coca on the excretion of urine; comparing five days on which coca was taken with five in which none was used; all the food, drink, exercise, sleep, etc., being as near as possible the same in each day. He says, "analysis showed that the addition of the coca decreased the quantity of urine 47.60 centimetres; of the urea, 2.0101 grammes; of chloride of sodium, 3.4167 grammes; of sulphuric acid, .2948 grammes; of free acid, .6945 grammes; and increased our weight one-eighth of a pound, and the phosphoric acid in the the urine, .0090 grammes. The action on phosphoric acid is to be considered normal. During the period of these last experiments our sleep was somewhat disturbed, with frequent headache, and slightly diminished appetite. Microscopically, we found in the urine an abundance of octohedral crystals of oxalate of lime of all sizes, which were got rid of by filtration. On micro-chemical examination of the leaves, we found quadratic crystals, soluble in hydrochloric acid but not in acetic, which we believe to be oxalate-of-lime crystals, and the source of those in the urine. Beneke's statement that the earthy phosphates are dissolved by oxalic acid, and appear in greater abundance when that acid is most formed in the human economy, possibly may be the explanation of the fact that the phosphoric acid was not diminished. From an examination of these experiments we are led to the conclusion that coca is a retarder

of the retrograde metamorphosis of tissues, thus increasing the weight of body. The origin of the frequent headache, the disturbed sleep, and deficient appetite, is not to be sought in the digestive apparatus, but rather in an influence similar to that exerted by other excitants of the nervous system, as coffee, and tea. Although the diminution of tissue-waste, as indexed in the urine, is not so great as was to be expected, knowing the arduous labor performed by the Peruvian Indians under its use, yet it is probable that there may be a greater decrease of the other excretions of the body. Its action on the urinary constituents is the same as that of coffee, as heretofore supposed. On comparison with tobacco, we find that the habit of chewing the leaves of each is not easily dismissed, that the water, urea, and chloride of sodium are decreased by both, but that the uric, phosphoric, sulphuric, and free acids are increased by tobacco. The effects of the habitual use of each on man can be explained by this action on the urine; for coca is not known to cause any great detriment to the health, or to shorten life, while tobacco in excess undoubtedly does the former, and probably the latter. From these data we conclude that coca-chewing is far preferable to tobacco-chewing, and that the former, without doubt, can be useful to persons having much labor to perform, with a scanty supply of food; although where food is abundant we see no good reason for the use of coca. We regret that we were unable to calculate the amount of fæces, of perspiration, and of the water and carbonic acid of the expired air; yet we hope that we have added a few facts of therapeutical as well as physiological value."

Prof. C. F. Chandler, of Columbia College, has submitted to the Metropolitan Board of Health a report, containing careful analyses of the milk which is supplied to the inhabitants of this city.

This investigation establishes the fact that the citizens of the Metropolitan District are generally receiving milk which is free from injurious adulterations, and untainted with disease.

Nevertheless, a fraud is perpetrated upon them in the systematic dilution of the milk with water. The average percentage of pure milk in the adulterated article, with which the city is supplied, is 73.28; or, in other words, for every three quarts of pure milk there is added one quart of water. It was stated at the Convention of Milk Producers and Dealers, held at Croton Falls, in March, 1870, that the total amount of milk supplied to the cities of New York and Brooklyn

from the surrounding country was about 120,000,000 quarts per annum. To reduce this to the quality of our city supply, requires an addition of 40,000,000 quarts of water, which, at ten cents per quart, costs us the snug sum of $4,000,000 annually, or about $12,000 per day.

Asylums for the Insane.—The superstitious mystery which so fills communities about asylums should be dispersed, and it can only be done by giving them a high character for thorough medical care of patients, and by the visitation of physicians, clergymen, public officers, and other intelligent citizens, who will not only see and appreciate the operations of hospitals, but impress their beneficent work on the public mind. The visits of idle and curious people are, of course, only evil. They do not see the fearful sights they anticipate, and go away either disgusted or under the impression that there are untold and concealed horrors, or they manufacture and retail, as facts, about what they imagine such a place should present. Friends of patients frequently tell us of the persecutions they are compelled to endure, not only from the stories of gossip-mongers and the advice of would-be wise people, but from the suspicions, misconceptions, and credulity of intelligent, good people, to whom it does not seem to occur that they owe it to themselves and to truth to verify before asserting and retailing injurious statements about great public charities. Many seem to hold themselves in a state of chronic and persistent antagonism to asylums, while a very small proportion of them have ever been inside of one. This is, indeed, kept up in quite a degree, by the delusions of uncured patients, and by discharged subordinates, and sometimes fanned by superseded officials, the very faults and delinquencies for which they lost place being charged upon asylums. These latter sources of misrepresentation, however, are inevitable, when integrity, discipline, and good order, are sought to be obtained and enforced, and cannot do any great harm, as the fact of dismissal is apt to creep out, and serve as a counterbalancing influence.

If physicians would more frequently accompany their patients to the asylum, and then give themselves time to go through the wards, the officers would generally obtain a better history of the case, the physician would enlarge his observation, and would be able to advise persons in the neighborhood of his practice of the character and general operations of the asylum. I am happy to say that this is of more frequent occurrence than formerly, and argues favorably for the better spread of intelligence among the people in regard to asylums. It would seem as though the officers of such institutions had

enough to do in the discharge of their duties to patients, and in recording their experience and observation for the benefit of medical science, and should not be necessitated, in order to pursue their labors in such peace as to insure success, to constantly stand guard over the institution against foolish and slanderous tongues, disappointed and discharged subordinates, egotistic cavillers, grumblers, and discontents, whose constant regret seems to be that they are not trusted with the management and censorship of public institutions, as they are disposed to be of the affairs of private individuals. It would seem as though scientific pursuits should move on independently of such malagencies, but such is not the fact practically. Philosophic lookers-on say, Why give any attention to them? they are insignificant. True, but so are gnats, flies, moths, and vermin, but they nevertheless soil, mar, annoy, and injure. It is, therefore, not only wise sometimes, but actually necessary, to defend the public interests against the ignorance, malice, misrepresentations, and even the idle tattle, of such people. During the past three years a number of public asylums have been subjected to the active persecution of this class, and in one State, at least, almost a panic produced, which, while it served to fill the newspapers with sensational paragraphs, and gratify a vast amount of prurient curiosity, and give pabulum to a regiment of gossip-mongers, was most disastrous to the welfare of the insane. Unhappily, these various influences will continue to operate against asylums until, by the general spread of intelligence in regard to them, their character, necessity, and usefulness, are understood and appreciated.—*From Dr. Gray's Report to the Managers of the New York State Lunatic Asylum*, 1869.

At a joint and special meeting of the Medical Society of the County of New York, and of the New York Academy of Medicine, held in the lecture-room of the Madison Square Presbyterian Church (Rev. Wm. Adams, D. D.), January 19, 1871, Drs. G. M. Smith, E. R. Peaslee, and A. Jacobi, were appointed a committee to prepare resolutions expressive of the feeling of these Societies in relation to the decease of Dr. William B. Bibbins. The meeting then adjourned, to attend the funeral in the adjoining church.

Whereas, An all-wise Providence has removed by death William B. Bibbins, M. D.:

Resolved, That, in the decease of Dr. Bibbins, the members of the Medical Society of the County of New York, and the Fellows of the New York

Academy of Medicine, are called upon to mourn the loss of one of their number, who has been endeared to them by his devotion to the interests of the medical profession; by his efficiency as a Treasurer, as a Trustee, and in other offices, and by his conscientious discharge of duty, as clearly but modestly evinced in the Christian principle which guided his public and private life.

Resolved, That, while thus recognizing professional and executive ability and rectitude, his late associates also bear witness that he possessed those traits of character essentially designating a genial companion, a true friend.

Resolved, That, in his varied and ardent labors to promote the welfare of the poor of this metropolis, he has left an example worthy of emulation and worthy of public recognition.

Resolved, That, a copy of these resolutions be preserved in the archives of the Societies, and also that a copy, signed by the President and Secretary of the joint meeting, be transmitted to his family, and published in the medical journals.

H. D. Bulkley, M. D., *Chairman.*

At an adjourned meeting of the New York Medico-Historical Society, held Saturday evening, January 21, 1871, the following resolutions were unanimously adopted:

Resolved, That in the decease of our President, William Burr Bibbins, M. D., this society, together with the medical profession, to whom he was widely known, here and throughout the country, has sustained a loss which it will be difficult for time to repair.

Resolved, That his uncompromising integrity of character, sincere devotion to duty, unquestioning acceptance of responsibility, and unwavering charity for his associates, distinguished Dr. Bibbins in and out of the profession; and with cultivated intellect, correct judgment, and singleness of purpose, contributed largely to secure such confidence of the profession in the efforts of the Medico-Historical Society as has rewarded their labors in past years.

Resolved, That Dr. Bibbins was one whose pure and upright life and matured convictions inspired confidence in whatever he did and said, and commanded respect among all with whom he was associated, and that, inscribed on the tablet of memory, the words "*integer vitæ*" convey in his case a meaning seldom exemplified.

Resolved, That in the faithful discharge of his duties to the sick, in his enthusiastic devotion to the advancement of medical science, and in his labors in benevolent and charitable associations, the example of Dr. Bibbins should be held in lasting remembrance as that of a man, who, as far as may be possible to the human and therefore erring, regulated his conduct to his fellows by a desire to do to others as he would that they should do to him.

Resolved, That a copy of these resolutions, signed by the officers of the

Society, be sent to the family of the deceased, and to the medical journals published in the city.

A. E. M. PURDY, M. D.,
Vice-President.

JOHN GORDON FRAZER, M. D.,
Secretary.

At a meeting of the Medical Board of the Demilt Dispensary, called for the purpose of giving their united expression in regard to the loss sustained by that institution in the death of Dr. Wm. B. Bibbins, as well as their estimate of him as a colleague, physician, and a citizen, the following preamble and resolutions were adopted :

Whereas, In His infinite wisdom the Almighty has been pleased to remove from this life our late colleague, and for many years a faithful friend to this Dispensary, Dr. Wm. B. Bibbins :

Resolved, That, as respects the Demilt Dispensary, for whose success he labored in its various departments with unexampled zeal and self-sacrifice, from its foundation to a very recent period, we regard his decease as a very serious loss, for, though not officially connected with it, his mature knowledge of its history and requirements often rendered his counsel desirable and highly valuable.

Resolved, That, as a public-spirited, high-minded, honest physician, his loss to the profession of this city, of the whole State, and indeed of the whole country, will be very difficult to repair.

Resolved, That, as a citizen, his active interest in public institutions calculated to advance the welfare of the community has rendered his loss, at a period of great usefulness, almost a public calamity; while his uniform kindness and ever-ready charity will, in the language adopted by his esteemed pastor, render him very greatly missed.

Resolved, That, as a citizen, a scrupulously-honest officer, a benefactor, and a high-minded, true physician, his removal from us has created a vacancy for which we are not prepared, and which we have little hope of filling.

Resolved, That a copy of these resolutions be transmitted to the Board of Trustees of this Dispensary, to the medical journals of the city, to three daily papers, and to the relations of the deceased.

The Female Medical Students at Edinburgh.—At the recent annual meeting of the contributors to the Royal Infirmary at Edinburgh, the Lord-Provost in the chair, the question of the medical education of women came under discussion. The ir-

repressible Miss Jex-Blake asked permission to "say a few words." In the course of her speech she made some hard hits:

"When I first came to Edinburgh," said Miss Jex-Blake, "nearly two years ago, I made it my business to call on most of the professors and leading medical men. I was received (with very few exceptions) with the utmost personal courtesy, though, of course, sometimes with disagreement from my own views. But there were exceptions. I called on Prof. Laycock. I left his house in perfect agreement with him on one point, and only one—that no woman who respected herself had better enter his class-room." (Laughter and "order.") Prof. Christison: "On the part of my colleague, I appeal to you, my lord, against any such insinuations against Prof. Laycock. ("Chair," "order," and uproar.) I ask the opinion of the Lord-Provost on this point." The Lord-Provost: "Well, I think Miss Jex-Blake has not made any strong insinuations." Prof. Christison: "Then I bow to your opinion, though I disagree with it." Speaking of the disgraceful conduct of the male students in the late riot, Miss Jex-Blake said: "The college-gates were slammed in our faces, and our little band bespattered with mud from head to foot." Prof. Christison next caught it for his interference, and was unmercifully poked up in this style: "This I do know, that the riot was not wholly or mainly due to the students at Surgeons' Hall. I know that Dr. Christison's class-assistant was one of the leading rioters (hisses and "order"), and the foul language he used could only be excused on the supposition I heard—that he was intoxicated. I do not say that Dr. Christison knew of or sanctioned his presence, but I do say that I think he would not have been there had he thought the doctor would have strongly objected to his presence." Dr. Christison: "I must again appeal to you, my lord. I think the language used regarding my assistant is language that no one is entitled to use at such an assembly as this ("hear"), where a gentleman is not present to defend himself, and to say whether it be true or not. I do not know whether it is true or not, but I know that my assistant is a thorough gentleman, otherwise he would never have been my assistant, and I appeal to you again, my lord, whether language such as this is to be allowed in the mouth of any person. I am perfectly sure there is not one gentleman in the whole assembly who would have used such language in regard to an absentee." Miss Jex-Blake: "If Dr. Christison prefers—" Dr. Christison: "I wish nothing but that this foul language shall be put an end to." The Lord-Provost: "I do not know what the foul language is. She merely said that, in her opinion—" Dr. Christison: "In her opinion the gentle-

man was intoxicated." Miss Jex-Blake: "I did not say he was intoxicated. I said I was told he was." The Lord-Provost: "Withdraw the word 'intoxicated.'" Miss Jex-Blake: "I said it was the only excuse for his conduct. If Dr. Christison prefers that I should say he used the language when sober, I will withdraw the other supposition." (Laughter.)

Rapid Cure of Buboes.—Dr. J. Grünfeld, assistant to Sigmund, of Vienna, has had much success in extracting the pus by means of a hypodermic needle, india-rubber tube, and syringe. Where the cavity fills again, a second operation of the same kind should be undertaken; and, when the pus is unhealthy, weak solutions, either of carbolic acid or chlorate of potash, should be injected, and pumped out again by the same syringe. Patients treated after this plan left the hospital much sooner than those whose buboes had been freely laid open.

Calcification of Brain-Cells by Commotion.—In one of the last numbers of his *Archiv*, Prof. Virchow publishes the following note, which we translate *verbatim:*

"When, some time ago (1856) I first discovered the occurrence of calcified ganglion-cells in the brain, I was inclined to place it under the head of the 'lime-metastases' I had already described. Since then, however, from the consideration of a large number of cases, I am convinced that another explanation must be given. The process obviously belongs to that series of phenomena that I have recently (1867) described as one of the peculiarities of dead parts still remaining in the interior of the human body. I find foci, especially in the cortex of the brain, in which the cells, with their processes, and sometimes also fine nerve-fibres, are calcified, and this extremely frequently after injuries of the bones of the skull. Sometimes at these spots of the brain atrophic depressions occur, the so-called yellow plates, as in the observations I have elsewhere recorded, while at others nothing is visible to the naked eye. In the former case, after a peculiar disintegration of the brain in the form of red softening has occurred, the calcified elements are found in the interior of the softened portion, but generally toward the periphery. In the thicker brown cicatrices they lie in the adjoining substance of the brain, the cicatrix containing dead brain-cells only. The latter is the most interesting case, as nothing is visible to the naked eye. On several occasions, where traces of external injuries, as fissures, were perceptible on the skull, I have investigated the subjacent uninjured portions of the gyri, and have found the ganglion-cells of the cortex calcified. These

were therefore genuine cases of necrosis by commotion. So far as I can see, no one has followed out these remarkable processes besides myself. Förster, who first described them, made his observations upon the spinal cord; mine were made exclusively upon the brain."—*Lancet.*

Effect of Carbolic Acid on the Kidneys and Urine.—Dr. J. W. Moore, of Dublin, translates from the *Upsala Läkare-förenings Förhandlinger* a paper on this subject by Dr. J. A. Waldenström:

Although this remedy has for a long time been used at the Academical Hospital in all forms of suppuration, with a view to checking decomposition of the pus, in three cases only did the urine exhibit any change which could be ascribed to the action of the carbolic acid. The first patient came in with a gangrenous phlegmon in the entire of the right leg. The largest portion of the skin and subcutaneous areolar tissue had sloughed away, so that it was possible to see the soleus muscle almost from its origin to its insertion. To arrest decomposition of the pus, the diseased bone inside the moist warm dressing was enveloped with a piece of lint dipped in the ordinary carbolic-acid oil. In consequence of the nature of the affection, and of the patient's advanced age, the prognosis was very bad, and when, after the lapse of eight days, simultaneously with the complete separation of the dead areolar tissue, the urine assumed a dark-red color, the case was regarded as hopeless. It was reasonable to suppose that the change in color had its origin in a resolution of the blood, but, notwithstanding the employment of all the chemical reagents, its presence could not be detected in the urine, which was clear and of a strongly acid reaction. On Prof. Almén, who kept the urine for closer examination, informing me that it contained carbolic acid in large quantity, I intermitted the use of the solution of the acid in question for a day, when the urine resumed its normal appearance, but as soon as the carbolic acid was again employed, the dark-red color returned. The advantage of employing carbolic acid (for preventing decomposition of the pus, and so the occurrence of septicæmia), and the possible injury from it (in producing a nephritis), made me doubtful whether I should desist from the use of it or not. However, it was tried for some days longer, but the pieces of lint were first wrung out in a dry towel before they were laid upon the sore, and as soon as this precautionary measure was adopted, the urine preserved its normal color.

The second patient resembled the one just spoken of in

every particular, not only as regards the seat of the complaint and its extent, but also in respect to the behavior of the urine in relation to the greater or less quantity of carbolic acid which was used in the dressing. The third case was a middle-aged woman with a very extensive periostitis in the right thigh. The pus that escaped on incision was thin, blood-colored, and easily underwent decomposition. The suppuration in the large cavity was profuse and of a fetid character. With a view to check decomposition of the pus, as much as two teaspoonfuls of a solution in oil of the acid was one day injected into the cavity, the latter having been previously rinsed out with water containing carbolic acid. The consequence was, that next day the urine possessed a tarry color. Some days later, when the urine had regained its usual appearance, the same injection was repeated, with a precisely similar result. The urine was then more closely examined, and was found to contain both albumen and the coloring matter of the blood. The latter had already disappeared next day, but the albumen continued, although in small quantity, for a few days. Death occurred as a consequence of septicæmia. A similar transitory presence of albumen in the urine was also observed in a patient who used carbolic acid internally for a syphilitic cutaneous eruption.

From what has been stated, we see, then, that carbolic acid is not as harmless as it is often represented to be. Separated by the kidneys, it acts as an irritant on these organs, and may give occasion either to a hyperæmia alone, or to a parenchymatous inflammation, which is not an unimportant complication of the other affections, even if they are not so serious. Neumann's investigations on the action of carbolic acid on dogs poisoned therewith also show that a considerable fatty degeneration in combination with a molecular breaking-up of the cells of the liver, hyperæmia of the kidneys with a turbidity and separation of the epithelium in the urinary passages, are the changes constantly met with on *post-mortem* examination.[1]

This obliges us to take the greatest precautions in the use, whether internal or external, of carbolic acid, and frequently to examine the urine in order to be able instantly to withhold it on the occurrence of a state of renal irritation. In solution in oil, too, carbolic acid appears to be more readily absorbed than in an aqueous solution, so that we should, in affections such as the first two brought forward, where the acid comes into direct contact with a large granulating surface, prefer the latter form to the former in using it; unless it be made weaker than usually employed (one part in six or eight).

[1] Archiv. für Dermatol. und Syphil. Part 3. 1869. P. 432.

The cause of this altered color of the urine, which is met with only in the external use of the remedy, we do not know with certainty, but it probably depends on the presence of some unknown oxidized products of carbolic acid. It may be assumed that this oxidation takes place prior to the absorption of the acid, because, otherwise, we should find the alteration in color of the urine in cases of its internal use also.—*Medical Press and Circular.*

THE following letters sufficiently explain themselves. They are but samples of the many received by Prof. L. A. Sayre, of this city, in recognition of the valuable services he has rendered the profession by his persistent course in carrying through to a successful issue the suit brought against him for alleged malpractice. A few more such righteous decisions as those obtained in this and the Reese suit (Philadelphia), and we shall hear less of these malicious prosecutions:

DANVILLE, KY., *December* 22, 1870.

PROF. LEWIS A. SAYRE—

SIR: The following resolutions, offered by Dr. W. B. Harlan, at the last regular meeting of the Boyle County Medical Society, held at Danville, Ky., December 20, 1870, and passed unanimously, will explain themselves:

Resolved, That we tender our hearty congratulations to Prof. Lewis A. Sayre at the successful termination of the infamous suit against him for alleged malpractice, and that our gratitude is due him for his determined resistance to this iniquitous attempt to extort money.

Resolved, That we recognize, and are deeply sensible of, the great service he has rendered the profession in forcing a legal investigation of the charges, by refusing all propositions for compromise, thereby upholding the dignity and honor of the profession, and offering a commendable example for every physician similarly circumstanced to follow.

Resolved, That these resolutions be spread upon the minutes of the Society, and the Secretary be directed to send a copy to Dr. Sayre.

JOHN D. JACKSON, *Chairman B. C. M. S.*

GEO. T. ERWIN, *Sec'y B. C. M. S.*

Will Dr. Sayre permit me in this connection to add my personal rejoicings at the extraordinary success he has achieved in this suit—the report of which, through Dr. Jackson, I read with great interest—and to express the gratitude I feel for the great service he has done the profession?

Respectfully,

GEO. T. ERWIN.

DR. LEWIS A. SAYRE, 285 *Fifth Avenue, New York City.*

READING, PA., *December* 6, 1870.

DR. LEWIS A. SAYRE—

DEAR SIR: As Secretary of the Reading Medical Association, I was requested, at its regular meeting, held in November last, to convey to you the congratulations of the Society upon the happy termination of the suit for alleged malpractice instituted against you in 1868. The charge was outrageous, while the result fully vindicated your claim to ability, skill, and conscientiousness as a surgeon. Accept our thanks for your effort to protect the profession at large from the envious and designing, and believe me, dear sir,

Truly yours,

JOHN D. BROOKE, M. D.,
Secretary Reading Medical Association.

MISS ELIZABETH GARRETT, M. D., is about to be married to Mr. James George Anderson.

Cinchona in India.—The planting of the Peruvian-bark trees has so fully succeeded in the Neilgherry Hills in India, that the first shipment of bark from a private plantation, to the extent of four thousand pounds, is taking place.

Donation to the Presbyterian Hospital.—The widow of the late Thaddeus M. Halsted, M. D., has made a donation to this hospital (of which her husband was a life member) of his medical library, surgical instruments and apparatus, office-table, reclining-chair, etc., together with a portrait-bust of the late John Kearny Rogers, M. D. It is to be desired that this noble example may be followed by numerous donations of a similar character. The bust of Dr. Rogers seems in its proper place, as his grandfather (the late Rev. John Rogers, D. D.) was one of the founders of the Presbyterian Church in this city and country.

Physiological Laboratories in Great Britain.—Dr. J. Burdon Sanderson, in a late number of *Nature*, gives an interesting account of the physiological laboratories in England and Scotland. Writing of that of Edinburgh, he says, it is fitted with all the instruments and appliances for research which are to be found in the laboratories of Germany, and for some time the students have been superintended in their studies by practical teachers, thoroughly versed in those methods of exact research which have been lately introduced into vital physics. In addition to the physiological laboratory, under the direction of Prof. Bennett, Dr. Maclagan, the Professor of Medical Jurisprudence, and Dr. Christison, the Professor of Materia Medica, severally open their laboratories without charge, requiring only the cur-

rent expenses to be met by those who profit by the researches. Besides these, there is the new laboratory of Dr. Arthur Gamgee, the Lecturer on Physiology, at the Royal College of Surgeons. Much good work has already been done in these laboratories, and there is reason to believe that Edinburgh will soon stand behind very few of the German schools of medicine in scientific productiveness.

The London schools are behind those of Edinburgh. Both at University and King's College physiological laboratories exist to which students are admitted. At Guy's, Bartholomew's, and St. Thomas's, similar ones are to be immediately organized.

This is a movement toward a more practical way of teaching medicine, and its importance cannot be too highly estimated. Dr. Sanderson remarks—and what he says is equally true on this side of the Atlantic—that, at this moment, the want which presses even more than that of laboratories, is that of *workers* in physiology—that is, of men already skilled in chemistry and physics, and prepared to devote a few years of their lives to continuous physiological or pathological research. The most efficient reason why such men are wanting is, that the statement, so often given in lectures, that medicine is based on physiology, is not really believed. There is a want of scientific conviction or faith. Consequently young physicians, instead of devoting their time and energies to research, spend the best years of their lives in the collection and exhibition of curiosities from the dead-house (miscalled pathology), in the compiling of masses of useless statistics, or in the performance of other drudgeries, as little conducive to their own improvement as to the advancement of science.

Sick and Wounded at Heidelberg.—Lord Shaftesbury, in a recent letter, says: "The care taken of the poor fellows was beautiful to behold. The *entente cordiale* is in great force between the French and Germans, who are as cheerful as the day is long."

A Common Source of Lead in Drinking-Water.—Dr. S. Dana Hayes, the State Assayer and Chemist of Massachusetts, thus writes to the *American Chemist:*

Several new phantoms, generally taking the form of poisoned articles of food, have lately been conjured up, and some unnecessary apprehensions occasioned in this way. But the evil effects of lead-poisoning are so often observed, that I venture to record the following professional experience; be-

lieving that attention cannot be too frequently drawn to a subject of such great importance in its relation to the health of mankind.

Nearly three years ago I had occasion to investigate the very rapid corrosion of metallic ice-pitchers, and was surprised to find them such a source of danger, to say the least. Since that time I have seen a number of cases of lead-poisoning, that could be assigned to no other cause than ice-pitchers used by the patients. It was known to makers and dealers that they corroded very rapidly from the inside, there being workmen who devote their time exclusively to repairing them; and in certain localities, where the well-waters are nearly alike, and particularly active, it was known that an ice-pitcher would only last two years in daily use. And, in one instance, I was assured, that a pitcher was returned to be mended which had lost five pennyweights of lead and other metals, from the inside by aqueous corrosion.

They were then manufactured in great numbers, hundreds of thousands each year, and were sent to all parts of the world from this country, being considered as very useful and highly ornamental.

They are made with double walls, that is, an ornamental outside casing, and an interior ice and water chamber, or the real pitcher itself; an air space of about half an-inch being left between the walls and bottoms, which, acting as a partial non-conductor of outside heat, preserves the ice and cold water for hours.

But experience had taught the makers that such vessels are not handled very carefully by domestics, and that they must be strong enough to resist heavy blows and knocks from the ice, often thrown in, especially on the bottom of the inner chamber. Therefore they were made with reference to resisting such rough usage, and without knowledge of the chemical action afterward found to occur inside.

These pitchers were made with the outer ornamental casing of britannia metal altogether, and the side-walls of the inner chamber of the same metal; but the bottom was of German silver, or copper, all being soldered together, and then electro-plated, inside and out, with silver. It is apparent that, with this construction, the inner chamber of each, when filled with common alkaline, aërated, or other corrosive water, is a mild galvanic battery, which increases in power with usage, the sides being composed of—

Tin	91
Antimony	5
Copper	4
	100

and the bottom pieces of copper, or of the alloy made from—

Copper	51.7
Zinc	34.5
Nickel	13.8
	100.0

while the soft solder used contains—

Lead	59.4
Tin	40.6
	100.0

I have examined a great many of these pitchers, both when in use, and when sent to be repaired, and observe that the strongest action occurs about the joints, following the solder, that the silver scales off and lead dissolves more or less rapidly in the water contained. There is also another action—a pitting of the britannia in spots—arising from impurities in the alloy, but this is accidental and does not yield lead.

One remarkable instance was that of a pitcher sent to be mended, simply because "it leaked." The inner chamber was taken out, found to be very much corroded, and a large part of the solder was wanting; but that the galvanic arrangement was complete, and the *battery* in active condition was ascertained by experiments and analysis as follows:

One pint of lake or pond water was put into this pitcher, lining (it would not contain more, as there were corroded holes through the sides), and kept at a temperature of 60° F. for a day and night; small portions of the water were removed and analyzed at the expiration of four, twelve, and twenty-four hours, corresponding quantities of fresh water being returned each time with these results:

After one hour, the water contained perceptible traces of lead.
" four hours 0.35 grain of lead.
" twelve " 0.80 " " "
" twenty-four 1.45 " " "
With merest traces of copper and silver.

The water used (Cochituate) was comparatively pure, and free from saline or other active constituents, such as are generally present in spring and well waters; the temperature was that often attained by water in ice-pitchers; while the lining was one which had been a short time before in daily use; and complete action was not obtained, as the chamber could not be half filled for this examination.

But, in drawing off all the water from the last determination, it was observed that particles of metal were visible, and not strictly in solution, although barely observable.

If these results be compared with the quantity of lead taken up by waters in passing through pipes, we find them

surprisingly large. Less than 0.01 grain of lead in a gallon of water has injuriously affected health, as in the old Tunbridge Well case for instance; while the quantity of this metal present in such waters is seldom more than one grain to the gallon. But from the water in this ice-pitcher I obtained lead at the rate of—

2.80	grains	per	gallon	in	four hours.
6.40	"	"	"	"	twelve hours.
11.80	"	"	"	"	twenty-four hours.

It is due to manufacturers of ice-pitchers to state that such dangerous galvanic batteries as these are seldom made now—those provided with glass or enamelled inner chambers having nearly supplanted the others. But the old kind still come to be repaired, and there are many thousands of them yet in use.

After describing the cases of lead-poisoning in the family of Louis Philippe, at Claremont, in 1848, arising from the use of water drawn through lead pipes that connected with an iron cistern, M. Gueneau de Mussy then drew this practical lesson which has been so often overlooked: "That contact, even mediately, between lead and other metals, should be avoided in the construction of all reservoirs destined for the conservation of water for domestic use."

In the *American Practitioner* for December, 1870, Dr. L. J. Woolen reports a case of removal of a horseshoe pessary from the bladder of a woman. The patient was seen six hours after the pessary had been applied, as was supposed, to the vagina. Severe bearing-down pains ensuing, it was deemed advisable to withdraw the pessary, but on search the instrument could not be found, and it was supposed to have slipped into the uterus. Dr. Woolen, however, readily detected it in the bladder, and removed it by an incision through the urethra, commencing half an inch behind the meatus and extending up to the neck of the bladder. The urethro-vaginal fistula thus created was partially relieved by subsequent operations. This case makes the fifth now recorded of introduction of the Hodge or open-lever pessary into the bladder—two reported by Dr. H. R. Storer, of Boston, one each by Dr. T. O. Edwards and Dr. W. H. Byford, and the fifth as above.

The After-taste of Quinine.—In practice there is often experienced a great difficulty in getting patients to take quinine, because of its after-taste, which to some is simply unbearable,

and, when antipathy thus exists, combined with a difficulty in swallowing pills, the therapeutic value of an important drug is lost. We find, and the fact may not be generally known, that the mastication of some acid fruit, as an apple or a pear, will permanently remove the disagreeable after-taste of quinine. The first mouthful of food should be well masticated and rolled through the mouth, so as to cleanse the teeth, etc., and then ejected. The second morsel may be swallowed, when it will be discovered that all taste of the quinine will be removed.—*Medical Press and Circular.*

New Instrument for securing the Pedicle after Ovariotomy.—Dr. Graily Hewitt, at the last meeting of the British Medical Association, read a brief notice of a new clamp, or rather device, for securing the pedicle *in situ* in the abdominal walls after ovariotomy. He said:

Surrounded as this operation of ovariotomy is with difficulties of various kinds, one of the greatest of these is unquestionably the treatment of the pedicle: not merely the securing of the vessels enclosed therein in such a way as to prevent hæmorrhage, but the dealing with it in such a manner as shall best conduce to the prevention of the pyæmic complications attendant or liable to be attendant on the healing of the wound.

For the purposes of the present paper, I assume that the best method of securing these two results consists in bringing the pedicle to the external wound, and there fixing it; considering as I do that, on the whole, this method is attended with less risk of secondary hæmorrhage, while it does not appear to be, judging from the results—the magnificent results, they may be termed—of Mr. Spencer Wells's practice, more liable, at all events, than others to the pyæmic complications. Mr. Wells has largely employed, as is well known, the "clamp" in his operations. My experience, a far more limited one than Mr. Wells's, has made me acquainted with difficulties which seem inseparable from the present manner of clamping the pedicle, and which have given me no little trouble in some of the operations I have performed, and in which the clamp was used. The clamp, by its shape and form, hides from view the part of the wound immediately beneath it, and it is difficult to dress it and keep it clean and dry; while in cases of short pedicle it produces troublesome pressure on the edge of the wound, and leads occasionally to ulceration and sloughing from such undue pressure. The newest form of clamp, though less liable to these objections, has another, which I have practically

had experience of, namely, that it is liable to slip, and allow the pedicle to escape altogether.

The instrument and method I now suggest may be described as follows: A framework of steel, shaped something like a shoe-buckle, measuring two inches and a half by one and three-quarters; the piece of steel of which the framework is made being two-eighths of an inch wide and one-eighth of an inch thick, is provided with studs or buttons, eight in number, three on two sides, and one on each of the other two sides. These buttons project three-eighths of an inch from the steel framework. It is to be used in the following manner: The pedicle, having been roughly trimmed, is perforated by a needle, armed with a double strong thread or whipcord ligature in two or three places, according to the width of the pedicle. It is then tied in segments, and the opposite ends are secured to the buttons of the framework above, one by one. The pedicle is now surrounded by the framework, while the cut edge of the pedicle is freely open to inspection and treatment in the centre, the tightness with which the ligatures are applied keeping the pedicle from slipping into the abdomen. In fact, the ligatures now act precisely as the tongue of a shoe-buckle.

The advantages of this method are, I think, sufficient to commend it. The wound can be more readily dressed; the pedicle is at all times accessible; the framework makes no pressure whatever on the edge of the wound at the point where the pedicle emerges; and the healing and covering in of the whole wound will be facilitated. There can be no question that dryness of the parts around the wound is most essential to the prevention of pyæmia; and it is exceedingly difficult to secure this with the ordinary clamp.

My first idea was to employ wire for the pedicle; but I find that strong twine is preferable, and infinitely more manageable.—*British Medical Journal.*

The authorities of Guy's Hospital, London, have issued the following order:

The governors reserve to themselves, in the interest of the public, and as one of the conditions of admission to the hospital, the right of causing a *post-mortem* examination to be made of the body of every patient who dies within the hospital, by the pathologist or his representative, for the purpose of accurately determining the causes of death.

In the event of the friends or nearest relatives being opposed to such an examination, they are to communicate their wishes to the superintendent, who will submit their objections to the medical officer who had charge of the deceased patient,

and, if he is of opinion that there is no urgent need for a *post-mortem* examination, the superintendent is authorized to dispense with it.

This course has been necessitated by the recent attacks on the authorities by certain persons who have denied the right of the authorities to make such examinations without consent of the relatives or friends of the patient.

The French Academy of Sciences has held its sittings regularly since the beginning of the siege, and its *Comptes rendus* have been published every week. Ballooning has been the chief subject under discussion. A few numbers of the *Revue des Cours Scientifiques* have been issued.

Miss Garrett, M. D., and Prof. Huxley, have been elected to the London School Board, first and second on the poll—the former by a triumphant majority over every other candidate.

Prof. C. L. Bloxam has been appointed to the chair of Chemistry in King's College, London, vacant by the death of Prof. William Allen Miller, M. D., F. R. S.

The Importance of the Study of Materia Medica.—Enough of the natural history and sources of the more important drugs to make the doctor a man of some culture in his profession should, we conceive, always be taught; yet we make no doubt that in some of our colleges too much time is spent upon these, to the exclusion of the weightier matters of the law.

Leaving out of sight therapeutics altogether, materia medica is by no means comprehended in these not immediately practical details. The physical characters of drugs, their adulterations, their active principles; the appearances and distinguishing tests of the latter; the comparative value and physical characters of the various preparations; above all, the chemical relations of the various drugs and preparations—these and other subjects make the practical part of materia medica, to strike out which from our medical studies would be to introduce confusion, uncertainty—aye, even lethal ignorance—into the daily practice.

How often have we seen silly and sometimes sadly fatal mistakes arise from want of such knowledge! Thus, syrup of squills and carbonate of ammonia—both stimulant expec-

torants—are frequently prescribed together, even by men deservedly high in the profession, through ignorance that, the former being made with vinegar, the combination is equivalent to squill and spirit of mindererus.

Not long since we met, in the country, a physician second to almost none in medical culture, who described three cases of extraordinary collapse with terrific vomiting, following the use of fluid extract of buchu. In the first two cases he had not thought of ascribing the symptoms to the medicine, but in the third, which nearly proved fatal, he could not avoid doing so. On smelling his bottle of fluid extract, which had been furnished by one of our most reliable drug-firms, the rank odor of veratrum viride saluted us, instead of the aromatic smell of buchu. How nearly had the absence of some practical knowledge of important drugs compromised the life of his patient!

It is only a few weeks since a fatal case of poisoning occurred in this city from an error, dependent upon ignorance, which, we venture to say, three out of four practitioners might make. Strychnia was prescribed along with iodide of iron in syrup of ginger, and consequently large crystals of the nearly-insoluble iodide of strychnia were precipitated. Every thing went well until the patient took the last teaspoonful in the bottle, which contained all of the alkaloid, and consequently killed her.—*Phil. Medical Times.*

Bandaging on the Battle-Field.—Prof. Esmarch, of Kiel, recommends that every soldier taking part in war should be provided with a new form of bandage, which he could use himself, if wounded, as the first dressing on the battle-field. After great battles, thousands of wounded often lie for days without help, and their wounds are exposed to dust, damp, dirt, insects, the sun's glare, or, it may be, to prolonged hæmorrhage, from the shaking to which they are subjected in removal, or the unskilful use of bandages. Prof. Esmarch recommends the use of a triangular cloth of linen or cotton, available for application to wounds, however serious, in every part of the body. It is in the form of an isosceles triangle, the longer side, the base, being four feet, and the others about thirty to thirty-six inches. The great and obvious merit of this bandage is its shape. It is surprising in how many forms a soldier, without any previous training, could make a convenient wrapper for wounds with a triangular piece of cloth, whereas experience has shown that only long practice gives the dexterity necessary to apply a long roll to a wound. There is much to be said in favor of Esmarch's plan.

The Medical Staff of the Prussian Army.—The *Allg. Med. Centr. Zeit.* of Berlin (No. 76, 1870) gives the following figures: One medical officer for every 500 men. Besides this there is a special body of surgeons intended for the sick and wounded in the field, which body is called the sanitary detachment. Every corps of the army is followed by twelve field-hospitals, each completely organized for 200 patients, so that every corps is provided with the means of treating 2,400 wounded. Each corps has besides a reserve, composed of three surgeons and three assistant-surgeons. There are also 200 civil surgeons, who have volunteered their services, attached to the army; and most of the great medical and surgical authorities of Germany have been appointed inspectors and consulting officers to the army sanitary department. Altogether there are about 2,700 medical men in active service with the German host. We find, however, in another part of the same paper that the Secretary of War has decreed that all medical men, who have chosen to serve as militants, should leave the fighting portion of the army, and take up medical duties, thus showing that surgeons are not too numerous.

Neglect of the Sick and Wounded in Paris.—The *Lancet* asserts that the sick and wounded from the fortifications and outposts are treated in a very careless way, being left for hours bleeding and suffering, and smarting from the bitter coldness of the weather. In one hospital they were left for ten days without either linen or lint, although the medical officer in charge had made daily requisitions, marked, "urgent, very urgent." In another only two medical aids were detailed by the Government to attend eighty patients who were either badly wounded or ill of fever. A surgeon sent for to operate at a hospital at Passy, on asking for instruments, was told "We have none." Other instances of neglect and ill-treatment are given.

Deaths from Chloroform.—The following case occurred in Yokohama, Japan, and is of especial interest in connection with the fact that the surgeon in charge of the case has been put on trial for manslaughter, the coroner's jury having rendered a verdict of "death from the effect of chloroform, administered without proper degree of care." The *Medical Times and Gazette* of London, in reporting this case, takes unquestionably correct and tenable ground in claiming that it is monstrous that a medical practitioner should be put upon his

trial for manslaughter because he is the subject of an accident in practice which is by no means very uncommon, which has happened to the most experienced surgeons and "chloroformists," and which no skill and no precautionary measures could prevent. But the candid confession contained in the last clause is worthy of note, inasmuch as the English surgeons generally advocate the use of chloroform in preference to ether. The case, as we gather from the somewhat confused evidence, was as follows;

Captain Gilfillan fell from his horse on a Sunday, and sustained a dislocation of the shoulder-joint. He was unable to procure surgical aid until the Monday evening. Dr. Dalliston, who then saw him, finding it impossible to reduce the dislocation, suggested the use of chloroform, to which the patient consented, he being in great pain and unable to endure any further attempts at reduction. A bottle containing an ounce of chloroform was procured, and the drug was administered by Dr. Dalliston, a Mr. Howles holding the bottle and pouring out the liquid according to the doctor's directions. The requisite degree of insensibility not having been obtained by the quantity used, more chloroform was sent for, and in the interim, about a quarter of an hour, the patient, as might have been expected, fully recovers from the effect of the first ounce, talking to his friends, and expressing his opinion that something stronger than chloroform will be required in his case to produce sleep. The second bottle, also containing an ounce, arriving, two doses were administered from it; but about a minute after the exhibition of the second dose the death of the patient suddenly took place—a spasm and cessation of the heart's action being the first things to attract the attention of the doctor and his assistants.

Dr. Hugh Bennet stated at the last meeting of the British Association that "he knew of one very sad case that had happened in Edinburgh. A young and beautiful lady, daughter of a barrister, in perfect health, went to a dentist's house one morning and had a tooth extracted. Five minutes afterward she was dead. That was only one of many similar cases that had occurred, but had never been published."—*British Med. Journal*, October 1, 1870.

A woman, while undergoing an amputation of the foot, by Dr. Dawson, at the Cincinnati Hospital, within a few days, suddenly died from the effects of the chloroform administered.

At the coroner's inquest, Prof. Taylor, who had made an autopsy, stated that there was slight fatty degeneration of the heart, but not sufficient to fully account for the death. The amount of chloroform administered was stated to have been not more than two drachms. The verdict of the jury exculpated the medical attendants from all blame of carelessness or unskilful use of the anæsthetic.—*Cincinnati Med. Repertory*, November, 1870.

In the mortality reports of the city of Boston for the week ending Saturday, April 9, 1870, is recorded the death of an aged man "during inhalation of chloroform at Deer Island." —*Boston Med. and Surg. Journal*, April 14, 1870.

Sir William Lawrence and Chloroform.—Prof. Christison stated at a recent meeting of the Edinburgh Royal Society, that in the summer of 1847, a few months before Sir James Simpson's discovery of the anæsthetic properties of anæsthesia, Sir William Lawrence had repeatedly tried an anæsthetic recommended to him under the name of chloric ether, and which he thought more safe and certain than sulphuric ether. It was, of course, the spiritus chloroform of the United States Pharmacopœia, or chloroform dissolved in ether. When Sir James's discovery was announced, Sir William and his assistant were busy in finding out a way to concentrate their ether, neither of them having any chemical knowledge.

Chloroform.—We abstract the following interesting observations on the action of chloroform from Prof. Paul Bert's "*Leçons sur la Physiologie Comparée de la Respiration*," 1870 (p. 137). The numerous authors who have written on the action of anæsthetics are not agreed as to the influence these substances exercise on the color of the blood. According to some, the blood retains its normal color; according to others, it becomes black in the veins, and even in the arteries its hue is much darkened. The latter opinion has originated the idea that the anæsthesia of chloroform is in reality a state of asphyxia. When an animal is submitted to the influence of an anæsthetic a period of excitement is in the first place produced. It has been already shown that this excitement, in the case of animals with low intelligence, is due to an irritation of the facial and buccal mucous membranes by the anæsthetic vapors; in animals of higher intelligence, such as man and certain dogs, it is, however, also due to delirum, originating

undoubtedly in abnormal cerebral sensations (see *Journal of Anatomy and Physiology*, November, 1867, p. 185). It is during this period, when violent movements occur, that the venous blood becomes black; and if it last long, and especially if it be accompained with embarrassed respiration, the color of the arterial blood may also become dark. Succeeding this stage of excitement, however, is one of resolution, during which the arterial blood becomes bright red, and even the venous blood may now be of a marked rose-color. If the quantity of chloroform is gradually increased, the animal dies; in which case asphyxia and not syncope has been caused, and the arterial blood assumes a black hue such as that of ordinary asphyxia. Bert has analyzed the blood drawn during the period of complete chloroform resolution, and contrasted the results with blood drawn before the administration. In one case, before anæsthesia, the blood contained, in 100 parts, 7.3 per cent. of oxygen, and during the period of resolution 12.4 per cent. In another case, 15.1 per cent. of oxygen before, and 18 per cent. during resolution. Thus, during the *uncomplicated action* of an anæsthetic, the blood is more rich in oxygen than during the normal condition. It is, therefore, erroneous to regard anæsthesia as a state of asphyxia.—*Journal of Anatomy and Physiology.*

Tobacco.—In discussing the principles of the treatment of asthma by tobacco, Prof. Sée (*Bulletin Générale de Thérapeutique*, November 15, 1869, p. 385) mentions several important facts in relation to the physiological action of this remedy. One of its leading characteristics is the readiness with which tolerance to its action may be produced. Many observations have established this, among the most striking of of which is that of Prof. Traube, who found that, while a small dose of nicotia given for the first time to a dog caused marked cardiac symptoms, the same dose administered a few hours afterward was completely inert. Sée points out that, in reference to their power of producing tolerance, medicines may be divided into three groups: in the first, tolerance is decidedly produced, often almost immediately, as happens conspicuously with tobacco, and less so with opium, belladonna, Indian hemp, and arsenic; in the second, in place of tolerance, cumulative effects result, as with digitalis and strychnia; and in the third, the effects are exactly proportional to the dose given, however frequently it may be repeated, as occurs with bromide and cyanide of potassium, etc. In reference to the influence of tobacco-smooking on the mental activity, it is asserted that a moderate indulgence produces a certain degree of cerebral excitation and facilitates mental work; but the

abuse of this habit diminishes the mental vigor. Tobacco augments the secretion of the gastric and intestinal glands, and hence aids digestion ; and it also acts as a diuretic. The action on the different organs appears to vary greatly with the dose. Thus, a small dose accelerates the heart's pulsations by direct excitation of the intracardiac ganglia; a somewhat large dose reduces the rate of the pulsations ; and a lethal dose completely arrests the action by powerfully stimulating the vagi nerves. The evil effects of excessive tobacco-smoking are elaborately treated of in a memoir by Dr. A. Blatin ("*Recherches Physiologiques et Cliniques sur la Nicotine et le Tabac*," Paris, 1870), which likewise includes an able investigation into the physiological action of nicotia. Dr. Kopf also contributes a paper on the same subject ("*De la Nicotine, Thèse de Strasbourg.*" *Gazette de Strasbourg*, 1870; and abstract in *Bull. Génér. de Thérap*, March 30, 1870, p. 284).—*Journal of Anatomy and Physiology.*

Small Pox in London.—A severe epidemic of small-pox is now raging in London. The deaths have risen from an average of forty-two in the three preceding weeks to sixty for the week ending December 3d, the highest number returned in any week since June, 1863.

Prof. Huxley on Tobacco.—At the last meeting of the British Medical Association a paper was read on the subject of tobacco by Mr. Wilkinson, a stanch opponent of the use of tobacco, and another on the same subject by Mr. Campbell, a firm advocate of its use. The papers gave rise to a warm discussion, in which Prof. Huxley took part.

He said that on the particular question of tobacco he was in the most awkward position imaginable. For forty years of his life tobacco was a deadly poison to him. He was brought up a medical student, and medical students were not averse to tobacco. Therefore, he had every temptation to acquire the habit of smoking, and many were the attempts he made, but they always resulted, after half a dozen puffs, in his finding himself on the floor of the room in which he chanced to be. From having been a medical student, he became an officer in the navy—and they knew that sailors were not averse to tobacco. He must confess that many a day, after a cruise under a hot sun, he had looked with the most complete envy upon his brother officers, who were stretched in what comfortable positions they could find, seeming to derive from the pipe a

solace such as could only be derived from the highest sources of pleasure. But he could not enjoy that pleasure at the time; and he need not tell his hearers that, under those circumstances, he was then the most inveterate tobacco-hater in the world. In fact, if it had not been for the tolerant ideas he had imbibed in his youth, he did not know if he would not at the time have supported any institution that had for its object the putting to death of tobacco-smokers. However, some three or four years ago he was making a tour in Brittany with some friends, and after entering an inn his friends commenced to smoke. They tempted him to a cigar, and they looked so happy, and it was so miserable and uncomfortable outside, that he tried if a cigar would make a changed man of him; and he found that he was a changed man. He found that he was in the position of a lamentable pervert; and, though he did not find from smoking that feeling of happiness which some people seemed to experience, still he felt that smoking was a comfortable and laudable practice, so far as he could discover from internal sensations. That was an illustration of the evil of bad associates, although the gentleman who led him astray was a most distinguished person, and a former president of the Association. From that day he dated his ruin; and, although he was not a constant smoker, yet whenever a smoke was going on he was pretty sure to join in it. So long as he kept within moderation in smoking, there was no more harm in it than he could discover in a cup of tea. Tobacco in moderation was a sweetener and equalizer of the temper; but the question of smoking or not smoking was like all other such questions. He did not see the use of being fanatical on either side. They might poison themselves with beefsteaks if they liked, and he did not know any thing worse or more likely to destroy health than excessive smoking. So it was with the abuse of every thing; and those who were unable to touch the smallest particle of tobacco had no right to abuse those who used it freely, any more than he (Prof. Huxley) had a right to recur to his former state, and looked down pharisaically upon his present one.

The Hygiene of the Dwelling, and its Bearing on the Moral Condition of Peoples.—From a very interesting address, by Mr. Robert Rawlinson, C. E., President of the Health Department of the Social Science Association of Great Britain, we extract a few paragraphs which, *mutatis mutandis*, will apply equally well to the condition of the poor classes in our own country:

"If human beings," he said, "have no means of observing the decencies required by civilization, it may reasonably be

expected that the doctrines which inculcate purity of life, of thought, and of speech, will be a dead letter. This question of human habitations is, therefore, the greatest problem sanitarians and statesmen have to solve. So far as history illustrates or explains any thing connected with the past condition of the masses of mankind, the story is one of utter state neglect in securing decent home accommodation. This has been true of the past, and is also true of the present, over the entire surface of the inhabited portion of the world. It is true of country districts; it is also true of towns and cities, however magnificent they may be in their outward appearances. To describe the mud and bog cabins of Ireland, the bothy of Scotland, and the cottage of England, would be to depict nests of foul air, of scrofula, of physical debility, and of moral impurity. There are reports in abundance on English, Scotch, and Irish villages and towns, setting forth the facts in all their hideous details. Single rooms occupied by all the members of a large family, males and females; father, mother, brothers, sisters, and male and female lodgers (sometimes pigs and dogs), mixed in one nest of impurity. To remedy this state of things was a duty in which the state had as yet failed, although sanitary legislation had commenced in 1848, and act upon act had been piled up, one to mend the other, till men 'learned in the law' could neither understand nor interpret the acts." Having referred briefly to the Royal Sanitary Commission, Mr. Rawlinson said: "Whether Parliament will provide any practical remedy for improving human dwellings remains to be seen. Poverty of the occupant is a plea which may be put forth by the peasant in the country, and also by the laborer in the town, and which cannot be gainsaid. The unaided poor cannot provide their places of residence, but must exist in such as they find: the poverty of the individual is, therefore, an effectual bar to improvement by him—he must take his health and his morals as provided for him by others. Defective house-accommodation produces disease, immorality, pauperism, and crime, from generation to generation, until vice has become a second nature, and morality, virtue, truth, and honesty, are, to human beings so debased, mere names. The money expended in relieving pauperism, in detecting and in punishing crime, and in supporting the sick, if properly expended, would provide sufficient funds to furnish improved house-accommodation. Taking floor areas and cubic space into account, and the money expended in such spaces, it will be found that wretched dens of misery and vice are more costly to the community than any equal area and cubic space in a palace. Statesmen have this lesson to learn, namely: that that which is necessary to

the well-being of society, and which individuals cannot provide, but which states can provide, must be the bounden duty of the state to furnish. No excuse can be valid. It does not follow that states must build and own cottage tenements; but it may be inferred that states ought to frame laws, and provide means and machinery for enforcing such laws and regulations as are necessary to bring about the required improvements." State aid, Mr. Rawlinson said, had been given in many forms, but on no definite principles; and he suggested as a question whether the state ought not to lend money for the pupose of sanitary improvement.

One of the great obstacles to sanitary improvement was noticed. "There are many persons who do not appear to value health, if providing the means to attain it touch their pockets. These persons in towns and villages are, small shopkeepers (in business or retired), small speculative builders, and owners of cottage property, generally owners of those of the worst class, which, on account of their badness, are relieved from paying rates, but in which fever and pauperism are manufactured with singular regularity; the parish relieving-officer indirectly, but nevertheless regularly, paying the rents."

He concluded with the following remarks: "Sanitary science, before it can be of practical use, must be learned by statesmen. The strength of a nation is in its health; and where there is the healthiest community, there bodily purity and morals will have the greatest development. Empires, monarchies, and republics, have this lesson to learn. In the cities of the republican States of North America, the worst sanitary defects of the worst cities of Europe are being repeated. The sanitary engineer of the future will know nothing of 'refuse matter' other than as a useful product, which, properly applied to the soil, will add to the wealth of the community. The aim and end of statesmanship ought to be to insure to every individual born in the state means of health and of morality. Each Englishman's home should not only be his castle, but his hospital. Charity will not then degrade, but will elevate; and that alone will be true charity which assists the poor to assist themselves, and so live independent of almsbegging and almsgiving. We are now proud of our charities—of our public hospitals, which cost £1,000 per bed, *plus* the additional expenses of administration, in which hospital-beds sick men are treated at a money rate three times greater than the wages they could ever earn when in health. 'Our charitable institutions are the glory of our land;' but happy will that state be which neither possesses nor needs such form of glory."

Objective Tinnitus Aurium.—Dr. Politzer brought before the Medical Society of Vienna on June 10, 1870, a young girl from whose left ear a rhythmical ticking can be heard. This is perceived even when the girl is asleep, and had continued for the last five months. This sound must not be confounded with the ordinary subjective tinnitus aurium, nor with the noise which some people can emit by contraction of the tensor tympani. The patient cannot stop the ticking, nor produce it when a pause has taken place. The sound, however, is no longer heard when the girl pronounces the German vowels *a* or *e*, nor when the velum is pressed upward. Dr. Politzer believes that the ticking is caused by the tensor palati mollis pulling from the Eustachian tube to the velum, by drawing the mucous portion of the tube from the cartilaginous part. Dr. Gruber doubted this explanation, and would refer the ticking to the action of the tensor tympani.—*Lancet.*

Death of Prof. George T. Elliot, M. D.—Just as this last form is going to press, the sad intelligence comes to us of the death, by apoplexy, of Prof. Elliot, at his house, in this city, on Sunday, January 29th. This event, though not perhaps surprising, was certainly unexpected, inasmuch as, since his previous attack in July last, there had been a steady and comparatively rapid improvement in his condition, and he had so far recovered as to warrant the hope that he might soon resume in full his professional duties. It was but a few hours before his death that we had a somewhat protracted interview with him, and, since his first illness, we have not seen him at any time in better spirits, or found his mental powers more keen and active. On this occasion he placed in our hands a short manuscript on "Bloodletting in Obstetric Practice." This paper, possibly the very last thing written by him, we shall publish next month, and, at the same time, give a sketch of his life.

THE LATE PROF. GEORGE T. ELLIOT, M. D.

(From a recent Photograph.)

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Original Communications.

Art. I.—*The Pathological Relations of the Gastric and Intestinal Tubules.*[1] By Austin Flint, M. D., Professor of the Principles and Practice of Medicine, and of Clinical Medicine, in the Bellevue Hospital Medical College.

The paper which I am about to read will not contain any original observations relating to the morbid anatomical changes taking place in the gastric and intestinal tubules. Experience, together with proficiency in practical microscopy, is requisite for the study of these changes, and I have not the qualifications nor the leisure to engage in it. As regards the histological aspect of my subject, the facts to which I shall refer have been contributed exclusively by three English observers, namely, Handfield Jones, Wilson Fox, and Samuel Fenwick. Aside from these facts, the considerations which I shall present are those arising from a clinical and a physiological point of view. I have for many years had a strong conviction that the secretory glands of the alimentary canal constitute a territory in pathology, until lately almost a *terra incognita*, whence are to be derived very important additions to our

[1] Read before the New York County Medical Society, February 13, 1871.

knowledge of disease. It has seemed to me a rational supposition that destructive lesions of these glands exist in a class of cases characterized by progressive and fatal inanition taking place without the evidence of disease existing elsewhere sufficiently to explain the symptoms and the termination. I have long been accustomed in lectures and consultations, as also in published writings, to predict that, in the cases now referred to, the tubules of the alimentary canal will be found to be the seat of degenerative changes which, in view of the important functions of these glands, will account satisfactorily for the symptomatic phenomena and death. I propose, in the first place, to give a brief account of some of the cases of this class which have fallen under my observation. After having done this, I will refer to the histological facts contributed by the three English observers whom I have named; and I will conclude by offering some considerations relating to the importance of the study of the gastric and intestinal tubules, not only in the cases in which, as may be conjectured, the primary and essential disease is here seated, but with reference to the probable occurrence in this situation of morbid changes which enter more or less largely into the pathology of a diversity of diseases:

Case I.—Fourteen years ago I had the care of a patient, about sixty years of age, whom I had known intimately for twenty years. During all this period and previously his health had been excellent, with the exception of occasional attacks of gout. He was a man of large frame, and his muscular system was largely developed; he had superior mental endowments, and his habits of life were unexceptionable. The only apparent cause of disease was a certain amount of mental annoyance incident to some domestic troubles. This patient, who had always been a good feeder, found his desire for food diminishing, and, for several months, he gradually reduced his diet in accordance with a progressive diminution of appetite, not suspecting that he had any disease, until his food consisted chiefly of liquids. His weight diminished, without notable emaciation; his strength failed, and at length he was obliged to keep the bed. At this juncture he came under my care. He had now complete anorexia, and a repugnance to food to such an extent that he could scarcely be induced to take it in any form. He was unable to get up without assistance, there being no paralysis, but only great muscular weakness. An examination of all the organs failed to show any evidence of disease anywhere. The heart and lungs were sound. The urine was free from changes denoting disease of

the kidneys. Nothing was discovered on exploration of the abdomen. The intellect remained intact, except that, for a day or two before death, there was, at times, some mental aberration. The pulse and skin did not denote fever. Death took place evidently from inanition, the mode of dying being purely by asthenia. Various tonic remedies and stimulants were given, with no benefit. There was no autopsy. The case was one in which I felt an unusual interest and responsibility. I studied it carefully, and I was wholly unable to form any definite idea of the nature and seat of the disease.

Case II.—In March, 1866, I visited at New Bedford, Mass., in consultation with Dr. Wm. A. Gordon, a gentleman, aged about sixty. He had always been a healthy man up to some months before I saw him. Without any appreciable cause, he had graually lost desire for food, and at length he had a repugnance to every form of aliment. *Pari passu* with the increase of anorexia, his muscular strength diminished, and at the time of my visit he was confined to the bed. It was impossible, in this case, to discover any local or general disease. There were not present symptoms, other than the inability to take food, going to show disease of the stomach or any of the digestive organs. The condition of the organs within the chest was normal. The urine, which was repeatedly examined, gave no evidence of renal disease. The intellectual faculties were unimpaired. There was no febrile movement. He had been seen by Dr. Bowditch, of Boston. Death took place not long after my visit, the immediate cause being evidently inanition. Owing to the objection of friends, there was no *post-mortem* examination. The patient in this case was a man in easy circumstances; his habits of life were, in all respects, apparently those conducive to health and long life. His mind was occupied with business without undue strain or excitement; he lived well, but was perfectly temperate both in eating and drinking, and his temper was remarkably equable. There was no apparent causation of the unknown fatal disease.

Case III.—In the summer of 1868 I saw repeatedly with my late lamented colleague, Dr. George T. Elliot, a gentleman of this city, aged about fifty-five years. He was a wealthy, retired merchant, greatly esteemed for his ability and probity. His habits were in all respects temperate and regular. He had a placid and benevolent disposition. To all appearance, his life might be cited as a model of practical hygiene. He had always had good health until some months before I saw him, when his appetite had begun to decline, and he frequently vomited after eating. In this case the heart, lungs, and liver, were carefully interrogated, and no evidence of disease of these organs was discovered. Nothing was found on careful exploration of the abdomen.

Attention was directed particularly to the stomach on account of the occasional vomiting, but there were no symptoms denoting either cancer, ulcer, or gastritis. It seemed to us that the inability to take, retain, and digest food, alone stood in the way of the recovery of health. Various tonics

were tried, and change of air, with apparently some temporary benefit. I saw him again in 1869. A repetition of the examination with reference to the existence of some definite disease was negative, as before. He was now quite weak, keeping the bed most of the time. During the last few weeks of his life I did not see him. He was under the care of a homœopathic practitioner; but I have ascertained that there was no essential change in the symptoms, and that the mode of dying was by exhaustion.

Case IV.—In May, 1869, an analogous case came under my observation. The patient was under the care of Dr. John C. Hutchinson, of Brooklyn. Dr. Willard Parker was associated in consultation. In this case the age was about sixty years. There had been for several months progressive diminution of appetite and strength. The patient, when I saw him, was confined to the bed, and death took place shortly afterward. Looseness of the bowels was a feature in this case, but the history and symptoms denoted intestinal indigestion, and not either intestinal ulceration or inflammation. All the vital organs, in as far as they could be interrogated, seemed to be free from disease. Emaciation was more marked in this case than in the preceding cases.

In these four cases the patients were males. I have, however, met with analogous cases in females. In October, 1868, I visited, in consultation with my colleague, Dr. Fordyce Barker, a female patient, and another female patient in January, 1869; the facts in both being essentially the same as in the cases of which I have given a brief summary. The age in each of Dr. Barker's cases was in the neighborhood of sixty years.

These cases represent a class, examples of which, I am sure, all practising physicians of much experience must have met with. The marked characteristics are gradual and at length complete loss of appetite and digestive power, with progressive debility, and death by exhaustion, adequate morbid conditions seated elsewhere than in the glands of the alimentary canal being excluded by an investigation of the symptoms and signs. In the cases just cited the patients were somewhat advanced in years, that is, near the age of sixty; they were healthy prior to the illness, which ended fatally; this illness was developed imperceptibly, and advanced slowly; the persons were singularly exempt from apparent morbific influences, being temperate and their habits of life regular; they were in easy circumstances, and, in a great measure, withdrawn from active occupation; the intellectual faculties remained intact up to a

few hours before death, and the mode of dying was typical of asthenia.

The impairment of appetite was the first symptom. I have failed to note the kinds of food against which especially the appetite rebelled. In one of the cases I recollect distinctly that the patient ceased taking animal food in any form, and confined himself to gruel and milk-porridge for months before he was obliged to keep the bed. I think that, in the other cases, the antipathy was greatest toward the albuminoid articles of diet. This is a point of interest as bearing on the localization of the affection in either the gastric or the intestinal tubules separately, and on the predominance of the affection in either, if both sets of glands be affected.

It may have already occurred to some of those present that there is a correspondence between this class of cases and the cases described by Addison, as exemplifying a form of disease which he called "idiopathic anæmia." When accompanied by a species of melasma, or a bronzed hue of the skin, it is known by the name "Addison's Disease." Addison was led to connect the phenomena with morbid changes in the supra-renal capsules. He did not consider the coloration of the skin as essential, but an incidental event taking place in only a certain proportion of cases. The anæmia, in his view, was the leading feature, and the grave pathological condition being dependent, as he thought, on disease of the supra-renal capsules. He says, quoting his language: "For a long period I have, from time to time, met with a very remarkable form of general anæmia occurring without any discoverable cause whatever; cases in which there had been no previous loss of blood, no exhausting diarrhœa, no chlorosis, no purpura, no renal affection, splenic miasmata, glandular, strumous, or malignant disease. . . . . It was while seeking in vain to throw some additional light on this form of anæmia that I stumbled on the curious facts which it is my more immediate object now to make known to the profession." The facts referred to at the close of this quotation are the existence, in these cases, of disease of the supra-renal capsules, and the absence of lesions elsewhere to account for, not only the melasma, but the anæ-

mia, together with the constitutional symptoms and the fatal termination. It is a reasonable supposition, as it seems to me, that Addison's cases, with and without the melasma, are to be classed with those which I have recited. Addison did not seek for the evidence of disease in the gastro-intestinal tubules. It is not a recent conjecture of mine that, had his necroscopical researches taken this direction, he would have found a more satisfactory explanation of the phenomena than the lesions of the supra-renal capsules on which, as he says, he stumbled. In a clinical lecture on anæmia, published in the *American Medical Times*, in September, 1860, I ventured this conjecture, which I expressed in the following language: "I have not the presumption to offer an explanation of these cases, but I have an idea which I do not hesitate to throw out, because I can do no more, and I give it only for what it may be worth. To follow it out by researches, which will show it to be either valuable or worthless, will probably not be within my power. I suspect that, in these cases" (that is, in cases such as were described by Addison), "there exists degenerative disease of the glandular tubuli of the stomach. It is, perhaps, the lot of some one to bring the microscope to bear upon investigations here with as much effect as George Johnson has done with respect to the renal organs;" and I added, "I shall be ready to claim the merit of this idea when the difficult and laborious researches of some one have shown it to be correct."

In considering anæmia as the distinguishing pathological condition, Addison regarded his cases from a limited point of view. The anæmic condition is an element, and an important element, but this is not the condition which kills. It is well known that anæmia, existing in an extremely marked degree, does not, *per se*, prove fatal. Other morbid conditions of the blood, of greater importance than the paucity of red globules, must have existed; and it is a reasonable supposition that the more important conditions involved a deficiency of nutritive constituents, resulting from insufficient assimilation. Dr. Edward Headlam Greenhow, in a summary of the constitutional symptoms in cases of Addison's disease, gives a fair epitome of those which, as I suppose, characterize destruction of the gastro-intestinal tubules. I quote from his clinical lec-

tures on Addison's disease: "The constitutional symptoms are gradually-progressive asthenia, often originating without any apparent cause, and seldom dating from any definite period; great languor and indisposition for exertion, with, in advanced cases, breathlessness and palpitation, frequent sighing or yawning, and generally faintness on making any muscular effort, sometimes even on being raised up in bed. There are almost invariably great weakness of the heart's action, and remarkable feebleness of the pulse, loss of appetite, irritability of stomach with nausea, and, toward the close of the illness, at least occasional, often persistent vomiting. The mind is generally clear to the last, but, so great is the prostration in the latest stages of the disease, that the patient often lies in a drowsy, apparently semi-comatose state, from which, however, he can be roused by questions, and to these he generally gives pertinent though slow and reluctant answers. The above I should class as the most characteristic symptoms of the disease; but there are in many cases pains in the loins, hypochondria, or epigastrium, and, more rarely, dimness of sight, vertigo, and, near death, a tendency to incoherence or delirium. Death takes place from asthenia, and often rather suddenly."

In this summary of symptoms there is evidence of something more serious than anæmia, and certainly it is not a reasonable supposition that these symptomatic phenomena are attributable solely to morbid changes in the supra-renal capsules.

Assuming that the cases of Addison's "idiopathic anæmia" exemplify the pathological relations of the gastro-intestinal tubules, a noteworthy fact in relation to these cases is that the anæmic condition, as denoted by the facies and certain of the symptoms, is sometimes a remarkably prominent feature. I have a memorandum of a case observed in 1859, in the New Orleans Charity Hospital, which was analogous to the cases described by Addison. An examination after death was made, but, as I was not aware, at that time, that Addison attributed the anæmia, when not accompanied by melasma, to disease of the supra-renal capsules, these organs were not examined.

I cite from my hospital record-book the facts which were noted at the time:

The age was thirty years, and the patient was a Spaniard. He remained in bed for several weeks, presenting a pallid and emaciated aspect, with no definite ailments except loss of appetite, occasional diarrhœa, and hæmorrhoids. For the last-named difficulty he was transferred to the surgical division; the hæmorrhoidal tumors were removed, and he was sent back to my ward. He presented the same pallor, emaciation, and debility, complaining only of the want of appetite and a sense of coldness in the stomach. Exploration of the lungs and heart gave a negative result. He was treated with tonics and stimulants. He grew weaker and weaker, and at length died by asthenia. A *post-mortem* examination showed no disease of lungs, heart, stomach, or intestines. The spleen was somewhat enlarged. Other organs were not examined.

In the memorandum of this case, the urine is not referred to. I am, however, sure that it was examined. I added a postscript stating that the blood was not examined for leucocythemia.

I noted the prominent facts in another case which came under my observation in the Charity Hospital of New Orleans, in 1860. The patient, a male, aged about thirty, entered with anæmia more marked in the countenance than I had ever before witnessed. The prolabia and face seemed absolutely bloodless. The skin had a slightly sallow tint. The conjunctivæ were remarkably clear—pearl-like. He had an anæmic murmur at the base of the heart, and in the carotids, together with a venous hum in the neck. There was slight œdema of the lower extremities. Careful examinations for disease of lungs, heart, kidneys, and other organs, were entirely negative. He was attacked, after his admission, with diarrhœa, which, at that time, was very prevalent in the hospital. There was complete anorexia. The action of the heart became notably feeble, and he died by slow asthenia, retaining his intellect to the last. There was no *post-mortem* examination in this case.

These two cases seem to be typical of the "idiopathic anæmia" described by Addison, without the dark discoloration of the skin. They differ from the cases previously given,

in the greater prominence of the anæmic condition, and in the comparative youthfulness of the patients. Cases essentially similar, as regards the constitutional symptoms, present a bronzed hue of the skin. Greenhow has collected and tabulated all the discoverable cases of disease of the supra-renal capsules of whatever kind, and all the cases of bronzed skin without any supra-renal disease, which have been reported from the publication of Addison's treatise in 1855, up to the year 1865, the number of cases being 196. In this collection will be found cases of disease of the capsules without bronzing of the skin, and cases of bronzing without disease of the capsules. Greenhow believes that facts demonstrate a relation between a particular form of disease of the supra-renal capsules and the symptoms which characterize Addison's disease. He confesses, however, our ignorance of the nature of this relation. "In truth," as he says, "this portion of the pathology remains as little understood as it was at the time of the publication of Addison's discovery." Without entering into any discussion of this topic, I will simply remark that to prove the dependence of the symptoms on lesions of the gastro-intestinal tubules would by no means disprove a pathological relation of some kind, in certain cases, between these lesions, or their immediate effects, and disease of the supra-renal capsules.

My object thus far has been to show, from a clinical point of view, *first*, the existence of a well-defined class of cases characterized by anorexia, impaired digestion, progressive debility, and death from inanition; and, *second*, in view of these clinical characteristics, together with the absence of adequate lesions elsewhere, the probability that the essential disease is seated in the secretory glands of the alimentary canal. Now let me ask what is wanted in order that, in this class of cases, lesions of these glands, involving loss of their functional capacity, shall be entitled to be recognized as an established fact? The answer to this question is obvious. The existence of lesions, more or less extensive and destructive, must be demonstrated by microscopical examinations after death. The abnormal changes must be shown to be morbid, that is, not

cadaveric; and their constancy in this class of cases must be established by a sufficient number of necroscopical examinations. As I stated at the outset, I have no original observations to offer in relation to these points of investigation. An important contribution, however, has been made recently by Dr. Samuel Fenwick, of London. Dr. Fenwick has demonstrated extensive and destructive lesions of the gastric tubules in a well-marked case belonging in the class the clinical characteristics of which I have considered. As Dr. Fenwick's communication led to the selection of the subject of this paper, and embraces, as I suppose, the first and only case on record in which the diagnosis of disease of the gastric tubules has been made and verified autopsically, I shall quote, without any omission, all which relates to the history of the case. The communication is contained in the London *Lancet*, the number for July 16, 1870 :

A gentleman, about forty-five years of age, consulted me in February last. He complained of great weakness and inablity for mental and physical exertion. Occasionally he had pain in the back, and a sensation of numbness in the legs; but there was no loss of feeling, nor appearance of paralysis. He was troubled with palpitation and breathlessness on exertion. He did not seem to be much emaciated; but his face was of the pale-yellowish color so often seen in persons with malignant disease, and the lips, tongue, and throat, were exceedingly bloodless. He had neither cough nor expectoration; the appetite was very bad; he suffered from flatulence, and occasionally from bilious vomitings, and the bowels were much confined. The pulse was exceedingly small and feeble. The complaint had come on so gradually that he could scarcely fix the exact time of its commencement; but he had been ailing for at least eighteen months. Previous to this date he had enjoyed good health; he had never suffered from any loss of blood, nor from ague or diarrhœa. On careful examination, no darkness of the skin could be discovered; no disease of the heart or lungs could be detected by auscultation and percussion; the liver and spleen were normal in size, shape, and position; the thyroid and lymphatic glands were not enlarged; the stomach was not dilated; and no tumor could be found in any part of the body. The urine was clear, acid, and free from albumen and sugar. A drop of blood, obtained from a prick of the finger, when examined by the microscope, showed no increase, but rather a deficiency, of the white globules. I prescribed steel and quinine, with a small dose of cod-liver oil; and recommended a nutritious diet, and a moderate allowance of wine.

About a week after I saw him, I learned that he had been attacked

with severe and persistent vomiting. Some of the fluid rejected from the stomach was sent me for examination, but it consisted only of thin bile. After a brisk purgative, the vomiting ceased.

February 22d he again visited me, and looked paler and more feeble than before. The pulse was now so weak that it could scarcely be felt, and no tracing could be obtained with the sphygmograph. He complained of a little pain below the clavicle, but in other respects his symptoms were unchanged. His appetite was exceedingly bad, and flatulence was troublesome. After this date he was unable to leave home, from increasing debility, and I saw him in consultation with Dr. H. May, of Tottenham, under whose care he had placed himself; but, although most carefully examined, we were unable to detect disease in any organ of the body. He gradually became more feeble and anæmic; and on two or three occasions he seemed to be dying, but again rallied. At last, after slight attacks of delirium, he died, apparently from exhaustion.

It was evident that all the symptoms from which the patient suffered arose from anæmia.* But, as he had been affected with no disease, such as ague, dysentery, or hæmorrhage, capable of directly producing this condition, and as there was no evidence of disease in any of the viscera, it could only be supposed that there was some imperfection in the blood-making organs, or in those connected with absorption. The absence of emaciation was sufficient to prove that the powers of absorption and of the digestion of fat and starch were not impaired; we had, therefore, only to examine the condition of the organs whose office it is to digest and prepare the albuminous materials of the food, namely, the stomach and ductless glands. There was no evidence of any affection of the spleen, thyroid, thymus, or lymphatic glands; and the absence of any dark discoloration of the skin seemed to negative the supposition that the supra-renal capsules were diseased. I therefore concluded that the stomach must be the organ in fault; and, as atrophy is its only morbid condition which is not accompanied by characteristic local symptoms, I designated atrophy of the gland-structure as the only disease present in the case.

Post-mortem Examination.—The face was of a pale lemon-color, and no dark discoloration was anywhere present. There was a considerable amount of fat in the subcutaneous tissue. A small quantity of fluid was found in the left pleura, and both lungs were rather œdematous, but, excepting a slight grittiness in each upper lobe, they were not otherwise diseased. The heart was covered by a layer of fat, but was normal in its structure, and not softened. The cavities were unusually empty, only a small, soft, gelatinous clot being in the right ventricle. The liver, spleen, pancreas, and supra-renal capsules, were all normal. One kidney seemed somewhat congested, but was healthy in its structure. The stomach and the upper portion of the small intestine were removed for microscopical

* It would be more correct, as it seems to me, to say from anæmia, together with a deficiency of nutritive principles in the blood.

examination. The stomach was empty, excepting a small quantity of gas, and its surface showed no signs of *post-mortem* digestion. When placed beneath the microscope, the pits on the surface of the gastric mucous membrane were seen to be well defined, and were rather larger than usual. The whole of the glandular structure of the organ was in a state of atrophy; in no part could I succeed in procuring a section of normal tissue. In the pyloric and middle regions the secreting tubes seemed to be converted into a mass of connective tissue; and it was only near the cardiac end that a trace of gland-structure could be observed. In this situation the gastric tubes were represented by scattered, flask-like bodies, filled with granular matter and fatty epithelial cells; in other places the ends of the tubes were expanded. Each of these was surrounded by fibres, and was lined internally by a layer of cells, the contents consisting of fat-cells and granular matters. Brunner's glands were unusually large. The villi of the upper part of the intestine were large, prominent, and contained fat. The fat, however, was not in the form of an emulsion, but appeared in large drops in the interior of the villi.

Where, as in the present instance, microscopical examination is alone relied upon for the detection of disease, there is always a suspicion lest mistakes should have arisen, either from *post-mortem* changes, or from imperfect observation. In *post-mortem* digestion of the stomach, the surface of the mucous membrane is necessarily the first part that is acted upon by the gastric juice; but in this case this was the only part that was healthy, and, in addition to this, the empty state of the organ precluded the chance of *post-mortem* solution. To remove any suspicion of error from imperfect observation, I requested Dr. Handfield Jones to examine the preparation along with me. This he most kindly consented to do; and, although numerous sections were taken from every region, we were unable to obtain any portion of normal gland-structure.

It is well known that an infusion of the gastric mucous membrane, when mixed with dilute hydrochloric acid, will dissolve albuminous substances; and I have found, by numerous experiments, that one ounce of such an infusion will, on the average, dissolve four grains of hard-boiled white of egg. I carefully scraped off the mucous membrane from the splenic and middle regions of the stomach of the preceding case, and infused it in two ounces of distilled water, along with half a drachm of hydrochloric acid, for twelve hours. A cube of hard-boiled white of egg, fifteen grains in weight, was then digested for nine hours at blood-heat, but at the end of this period the albumen had not lost in weight, and the only change produced was a slight softening on its surface. This experiment, therefore, confirmed the conclusion drawn from microscopical examination, that the gland-structure of the stomach had been so seriously diseased that it could not have been capable of performing its functions during life.

The *post-mortem* examination thus explained the symptoms under which the patient labored. The progressive atrophy of the stomach had pre

vented the digestion of the albuminous materials of the food, at the same time that the healthy condition of the liver, pancreas, and intestines, admitted of a free supply of other constituents of the body. We know that the intestines possess some power of digesting albumen, and in many instances they no doubt compensate for a diminished action of the stomach, but in the present instance they seem to have been incapable of maintaining life.

It is to be regretted that the microscopical examination, in this case, was limited to the stomach and upper portion of the small intestine. It would have been well to have demonstrated that the secretory glands throughout the small intestine were free from disease. As it is, this is only an inference from the fact that the non-nitrogenous principles of food were digested, this fact being shown by the absence of emaciation. Aside from the desirableness of having this inference confirmed by direct observation, if the intestinal tubules had been found unaltered, this would have been evidence that the changes in the gastric tubules were morbid and not cadaveric. The supposition that the latter changes may have occurred after death has already been made by Dr. Leared.

Assuming the appearances as described by Dr. Fenwick to denote disease, the importance of this case seems to me such that, were I to attempt to express my sense of it, I could hardly refrain from a manifestation of enthusiasm which would, perhaps, be out of place. A single case, however, is not sufficient to establish the anatomical characteristics of a disease. It remains to demonstrate the existence of lesions seated in the gastric tubules, and the absence of adequate lesions elsewhere, in a series of cases characterized by the same prominent events during life. If it be found, in a sufficient number of the cases belonging to the class which seems to be clinically well defined, that lesions of the gastric or the gastro-intestinal tubules are constant, then a new disease is established, or, what is more probable, a new group of diseases, for it is a reasonable supposition that the gastric and the intestinal tubules may be affected separately, as well as conjointly, and also that the lesions in different cases differ in kind as well as in degree and extent. Nor does it, by any means, express all the importance of lesions of these glands, to consider

them as the anatomical characteristics of a group of diseases which as yet are unknown in nomenclature and nosology. There are grounds for the belief that lesions here seated are often associated with other diseases, and that functional disorder of these glands enters much more largely into morbid phenomena than has been hitherto supposed. Before offering some remarks in relation to these topics, I will refer to the state of our present knowledge of the morbid anatomy of the gastric and intestinal tubules.

I have already mentioned three writers who have contributed results of the microscopical study of these glands, namely, Handfield Jones, Wilson Fox, and Samuel Fenwick. Their contributions comprise all the literature relating to this study with which I am acquainted. I have named them after the chronological order of their publications. The merit of having first engaged in elaborate researches in this direction appears to belong to Handfield Jones. Thomas K. Chambers, in his work on digestion, published in 1855, says that two German writers, Engel and Wedl, had cursorily alluded to the subject; and Wilson Fox refers to a paper by Dr. F. Schöpfer, communicated in Virchow's Archives after the publication of Dr. Jones's observations in the volume of the Medico-Chirurgical Transactions, published by the Royal Medical and Chirurgical Society of London, in 1854. This paper by Dr. Jones is entitled "Observations of Morbid Changes in the Mucous Membrane of the Stomach." The facts contained in this communication were reproduced in a monograph, entitled "Pathological and Clinical Observations respecting Morbid Conditions of the Stomach," published in London in 1855. Dr. Jones examined with care the stomach in one hundred cases which were not selected, but taken as they presented themselves, death having been caused by a variety of diseases. Of these one hundred cases, in twenty-eight the stomach was nearly or quite healthy, leaving seventy-two cases in which there were deviations, more or less in degree and extent, from a healthy condition. Of these seventy-two cases, in eleven there was a moderate, and in fourteen there was a great amount of destruction of the tubules. Limiting the attention

to the tubules, Dr. Jones recognized the following different lesions: 1. Atrophy from pressure upon the tubes by an inter-tubular deposit which he calls "nuclear," and also from a fibroid formation. He considers the latter as similar to the lesion in cirrhosis of the liver. 2. Granular and fatty degeneration occurring without inter-tubular deposit or fibroid formation. 3. Pigmentary deposit both within and between the tubes. 4. Cystic formation. 5. Mammillation, which he attributes to atrophy limited to certain points, and which he regards as analogous to the granular condition of a wasted kidney. The mammillations are the parts where most of the natural tissue remains. The one hundred cases are tabulated, the facts relating to morbid appearances elsewhere than in the stomach being given, and also some of the facts of the clinical history. The latter facts are, however, meagre. As regards "the symptoms by which the morbid states might be expected to declare themselves," he says, "they are so obscure as to be scarcely at all noticed in the records to which I have had access." An examination of the tables, and of some histories which are introduced in his monograph, discloses evidence of the pathological relations of the gastric tubules as manifested by anorexia, defective digestion, anæmia, and inanition. But he does not consider the different changes as constituting the anatomical characteristics of any particular disease or diseases, nor the importance of these changes when associated with other diseases.

A paper by Wilson Fox, entitled "Contributions to the Pathology of the Glandular Structures of the Stomach," was published in the volume of the Medico-Chirurgical Transactions for 1858. Dr. Fox followed in the footsteps of Dr. Jones, and examined the stomach in one hundred cases taken indiscriminately from bodies brought for *post-mortem* examination. Like Dr. Jones, he studied the morbid appearances almost exclusively, stating that his engagements prevented him from "instituting any accurate comparison between the *post-mortem* appearances and the symptoms during life."

He considers the deviations from the normal structure to be of six kinds, as follows:

1. Increase of the connective tissue between the glands

and of the submucous tissue, with occasional fatty degeneration of the latter.

2. Withering of the membrana limitans of the glands.

3. Fatty degeneration, or atrophy and loss of the glandular epithelium.

4. Pigmentary deposit in the tissues.

5. Cystic degenerations in the glands.

6. Occasional fatty degeneration of the vessels.

He describes also a case in which the stomach was the seat of the so-called waxy disease. He does not give the proportion of the one hundred cases in which these changes, either severally or collectively, were found; and, as just stated, he does not enter into any consideration of them from a clinical point of view.

Dr. Samuel Fenwick, whose report of a case, in which disease of the gastric tubules was diagnosticated, I have introduced already in this paper, is the author of a memoir "On Morbid Changes in the Stomach and Intestinal Villi present in Persons who have died of Cancer," contained in the volume of Medico-Chirurgical Transactions, published by the Royal Medical and Chirurgical Society of London in 1865. He gives, in his memoir, the results of the microscopic examination of the stomach in fifty-seven, and of the intestines in twenty-three, cases of cancer. His opportunities were limited to an examination of the changes in the mucous membrane of the stomach and intestines. He expresses regret that he was unable to give "the history of each patient, and a description of the peculiarities of the local disease, or to report the manner in which digestion was performed during life."

Dr. Fenwick premises his researches in cases of cancer by the statement that, "out of one hundred cases, exclusive of cancer, he found seventeen in which the gastric tubes in the splenic and middle regions of the stomach had undergone considerable morbid changes." In seventy-five per cent. of the cases of cancer of the breast, the gastric tubes in the regions just named were extensively diseased. He says: "In no disease have I seen the secreting tubes so greatly destroyed as in cancer of the breast." Of the cases of cancer in the uterus, morbid changes in the stomach were found in only twelve

per cent. In ten of eighteen cases of cancer in other situations, the gastric tubes were more or less diseased.

In twenty-three cases the intestine was examined. His attention, however, appears to have been directed chiefly to the villi. Of the intestinal tubules, he merely states that their cells were often intermixed with nuclei. It is evident that the secretory glands of the intestine were not much studied.

Dr. Fenwick found, in his cases, the same forms of lesion in the gastric tubules which Drs. Jones and Fox had previously described; namely, disappearance of the cells, granulo-fatty degeneration, and atrophy from the pressure of enlarged solitary glands, and an increased formation of fibrous tissue. He noted, in addition, notable thinning of the mucous membrane, and decrease of its weight. He also tested the digestive power, by observing the effect upon albumen of an acidulated infusion of the mucous membrane, showing by this experiment that, when the tubules were extensively diseased, the membrane was deficient in pepsin.

In concluding his memoir, Dr. Fenwick says that the practitioner "will see in these alterations in the blood-making organs an explanation of the anæmia that so often ushers in and accompanies malignant disease, and he will be encouraged to hope that means may be discovered to arrest the progress of these alterations, or obviate their effects upon the system."

Dr. Fenwick has contributed still another paper, which relates to the tubules of both the stomach and intestines in cases of scarlatina. This paper was read at a meeting of the Royal Medical and Chirurgical Society, and is published in the London *Lancet*, July 23, 1864. He studied the morbid appearances in ten cases during the first week of illness, and in six cases in which death took place during the second or third week. In the first week, as he describes the tubules, they were "greatly distended by granular and fatty matter, or by small cells intermixed with granules." After the second or third week, the tubes were less distended than at an earlier period, "their closed ends being still loaded with granular matter, obscuring greatly the gastric cells." After the reading of Dr. Fenwick's paper, Dr. Murchison stated that he had examined the stomach in twenty cases of scarlatina, and had

observed similar appearances; but these appearances were not found in all the cases, and he had observed them in the stomachs of those who had died of other diseases.

Dr. Fenwick examined microscopically the matter vomited in one of the cases of scarlatina, the disease being in the third week of its duration. In this matter fibrinous casts of the stomach-tubes were discovered. The contents of the stomach after death were examined microscopically in all the cases. In the cases in which death took place during the first week, the contents of the stomach contained "pieces of fine membrane, cells, granules, and shreds of membrane. . . . The membranes were of the shape and size of the stomach-tubes, and were covered with granules and fat. . . . In the cases of longer duration, the membranes were covered with cells, and were also of the size and shape of the stomach-tubes." He adds that, "in order to ascertain if these appearances were trustworthy as evidences of inflammation, the contents of the stomachs of forty-five subjects were examined at the Middlesex Hospital, the condition of the mucous membrane being at the same time noted. In only one case were there any fibrinous casts, and this was a case of acute gastritis. In eighteen cases there were only separate cells, chiefly of the columnar form, and in none of these cases was there any inflammatory action. In eight cases casts of the upper part of the tubes were plentiful, composed only of healthy conical cells, and in all these cases the mucous membrane was in a natural condition. In eighteen cases there were either plugs formed of cells and granules from the secreting parts of the tubes, or the casts of conical cells were overlaid with granular matter, and in all these cases the stomach was more or less inflamed." He stated further that he had found casts of the stomach-tubes in the matter vomited in several cases of gastritis not connected with scarlatina.

So far as I can learn, these papers by Jones, Fox, and Fenwick, represent our present knowledge of morbid changes taking place in the gastric and intestinal tubules. Of course further researches, by microscopical and other means of observation, are needed and demanded. They will doubtless ere

long be made, and their results contributed. Meanwhile, we may consider certain facts as established by the labors of the able observers just named. It is certain that, in subjects dead with various affections, the gastric tubules are often found to be more or less diseased. Their liability to speedy cadaveric changes is fully appreciated by each of the observers just named, and it is quite improbable that the abnormal appearances which they describe were produced *post mortem.* Their observations show that the proportion of cases in which disease of these glands occurs differs widely in different affections; but the number of cases analyzed with reference to this point is too few for deducing laws respecting the relative liability of different affections to this complication. The concurrence of the results of these three observers, as regards the different kinds of lesion, is striking, and is corroborative of the correctness of their observations. Another striking fact is, the different kinds of lesion correspond, in a striking manner, with the different morbid changes occurring in glandular organs which in structure are analogous; I refer to the kidneys. Compared anatomically, the kidneys and the secretory glands of the stomach and intestines differ chiefly in the arrangement of the tubes, which in the former are long and convoluted, and in the latter short and straight.

On the other hand, the facts contributed by these observers are not only insufficient to establish laws relating to the relative frequency of the occurrence of morbid changes of the gastro-intestinal tubules in different affections, but they are almost barren as regards the relations of these morbid changes to symptoms. In each of the papers the author disclaims any important researches in the latter direction. It remains for other observers to study the facts relating to the morbid anatomy in connection with the clinical details. The single case reported by Fenwick, in a late communication, is an important exception to the statement just made. Moreover, the researches of these observers have been limited almost entirely to the changes taking place in the gastric tubules; hardly more than a beginning has been made in the study of changes taking place in the intestinal tubules. The microscopical examination of the matters vomited, and of the contents of the stomach

after death, has been prosecuted to some extent by Fenwick. It is one of the interesting and important points of inquiry remaining to be elucidated, whether, as in the diseases of the kidneys, the microscope may not be made available in the diagnosis of affections of the gastric tubules. Of course, the morbid products and desquamated epithelium which may be thrown off from the intestinal tubules are beyond the reach of microscopical examination during life.

In accordance with the plan which I proposed at the outset, I shall submit, in conclusion, a few considerations relating to the importance of the study of the pathological relations of the gastric and intestinal tubules in different diseases.

The question may arise, If these glands really have pathological relations as important as may be conjectured, why is it that their study has hitherto received so little attention? The answer to this question is, Our present knowledge of the anatomy and physiology of these glands is of recent date. Their structure was, of course, not known prior to the use of the microscope in anatomical researches, or, in other words, the creation of modern histology. It is only within a few years that their functional importance has been fully appreciated. Let it be considered that the beginning of our present knowledge of the morbid changes taking place in the kidneys, and of the pathological relations of those changes, dates from the publication of Bright's researches in 1827; and how great has been the advancement of this knowledge during the last twenty-five years! Such a question as I have just raised might, with as much pertinency and force, have been asked, within the memory of the older members of our profession, respecting the pathological relations of the kidneys: and let it be considered how large is the space in pathology now occupied by the morbid changes taking place in these glandular organs!

In reading the papers to which I have referred, as representing our present knowledge of the morbid anatomy of the gastric and intestinal tubules, it is clear to my mind that these authors were not sufficiently imbued with a sense of the importance of the researches in which they engaged; and so

Richard Bright could hardly have had an adequate idea of the immense results to which his labors were to give rise.

It is fair to estimate the probable importance of the pathological relations of the secreting glands of the alimentary mucous membrane by their physiological importance. The tubules of the stomach and the intestines together form an immense glandular apparatus. The functional activity of the gastric tubules is known to be extremely great, experiments appearing to show that the gastric juice secreted during twenty-four hours amounts to the enormous quantity of fourteen pounds, being not much less than the average quantity of blood contained in the body. The tubules in the intestine, owing to the greater extent of the mucous surface, exceed in number vastly those of the stomach, but experiments have as yet failed to furnish any data for determining the quantity of the intestinal juice. The amount of the latter, perhaps, exceeds that of the gastric juice, in a proportion corresponding to the difference as regards the number of tubules. These two digestive liquids, together with the salivary fluids, the bile, and the pancreatic secretion, are at the portals of vegetative or organic life. They are essential as the first of the series of processes by which aliment is converted into the blood and the tissues. Upon gastric and intestinal digestion depend the consecutive functions ending in growth and repair, as also the normal condition of all the organs of the body. These physiological facts are trite enough, but they lead to a consideration which, it is evident, has not received sufficient attention, namely, the glands which secrete the essential factors in digestion cannot be extensively diseased without giving rise to impoverished blood, impaired nutrition, diminished muscular strength, weakness of the mental powers, and various abnormal conditions incident to these effects. In cases in which the glands are alone diseased, it is plain that their secretory action may be so far affected as to cause death from inanition; and, of course, the evils and the dangers arising from extensive disease of these glands are enhanced in proportion to the gravity of other associated affections.

Another consideration, pointing to the probable importance of the pathological relations of the gastric and intestinal

tubules, is the difficulty, in many cases of different diseases, of explaining certain symptoms and accounting for death otherwise than by supposing these glands to be diseased. Fenwick raises this point in his memoir on morbid changes in the stomach and intestinal villi in persons dying with cancer of the breast. He says: "In many cases of cancer we can scarcely account for the death of the patient. There is no secondary formation in any important organ, and the failure in strength has been out of proportion to the amount of local mischief, so that we are forced to admit either that the blood has been infected, or that some fatal change of a non-cancerous nature has occurred in the viscera." The statement is equally true of various other affections. Cases of phthisis furnish illustrations with which every one is familiar. How common is it to see on the one hand persons living on for months and years with enormous destruction of the pulmonary organs, and, on the other hand, persons dying with comparatively a small amount of damage! We say of the latter cases, that the vital powers soon give way, and, of the former cases, that there is a remarkable tolerance of disease. We express in this way obvious clinical facts, but we do not explain them. Clinical observation teaches that in cases of phthisis, and also in other chronic affections, the speedy giving way of the vital powers, on the one hand, or, on the other hand, the remarkable tolerance, depends, other things being equal, on the ability or otherwise to ingest, digest, and appropriate food. This clinical fact suggests the question, Why is it that, with an equal amount of disease of the lungs, or elsewhere, in some cases there is loss of appetite, of digestion, and consequently of appropriation, leading to exhaustion and death, while, in other cases, these functions being preserved, the vital powers are maintained and life continues? Taking into view the observations of Jones, Fox, and Fenwick, which show that in phthisis and other chronic affections the glands secreting the digestive fluids are liable to become diseased, the answer to this question is that, probably, in the one class of cases these glands are but little or not at all affected, while in the other class of cases they are the seat of morbid changes.

Reasoning from a physiological stand-point, and also, to

the extent of our present knowledge, from clinical and autopsical observations, we are warranted in considering a persistent loss or impairment of digestive power, together with anorexia, as the symptomatic evidence of morbid changes in the gastric and intestinal tubules. Extensive destruction of these glands seems to render the ingestion of food not only difficult, but impossible. As regards the ability to take nutriment, the condition is analogous to that in which a temporary complete anorexia is caused by repletion of the stomach. It remains to be determined whether the inability to take certain kinds of food may not have a relation to the destruction of the gastric and the intestinal tubules separately. Considering the difference in function between these two sets of glands, it may be conjectured that, if the gastric tubules be alone affected, the anorexia will relate chiefly to the albuminoid or nitrogenous articles of diet; and the ability to ingest and digest fats, starch, and sugar, remaining, emaciation or the loss of weight will not be marked—a fact observed in the case lately reported by Fenwick, and in the cases of idiopathic anæmia described by Addison. On the other hand, we may conjecture that, if the intestinal tubules be alone destroyed, the ability to ingest and digest albuminoid substances may be retained, and the anorexia, together with the loss of digestive power, will relate to the non-nitrogenous principles of diet. In the latter case, it would be expected that emaciation should be more marked. But the changes occurring in the intestinal tubules, either with or without changes in the corresponding glands of the stomach, are yet to be studied.

In writing this paper my object has been to direct attention to the gastric and intestinal tubules, as inviting further researches with reference to morbid changes, and their pathological relations. Here is a territory in pathology which has been but little cultivated, and portions of which have scarcely been explored. I believe that highly-important additions to our knowledge of disease are to come from this quarter. We have in this country, and in this city, zealous and competent histological observers. I shall be glad if my remarks should happen to induce any to prosecute studies in this direction.

The ends to be desired are, that the morbid changes taking place in these important organs be fully determined by means of carefully-conducted microscopical investigations, and that the symptoms and effects which are attributable to these changes be ascertained by clinical observation. I shall not lengthen this paper by deprecating a charge of presumption in predicting great results to be looked for from labors which others are called upon to perform. I will only say, if from the perturbations of the heavenly bodies the existence and situation of undiscovered planets may be deduced, why may not the student in pathology venture, with a due regard to modesty, to reason from morbid phenomena concerning the direction in which new pathological developments are to be expected?[1]

Art. II.—*Remarks on Bloodletting.* By George T. Elliot, M. D., Professor of Obstetrics and the Diseases of Women and Children in the Bellevue Hospital Medical College, Physician to Bellevue Hospital, etc., etc.

[There is a peculiar, almost mournful, interest attaching to the following article, it being the last paper from the pen of Dr. Elliot, and finished but a short time before his death. The manuscript was written with the left hand, and therefore under considerable restraint, and the reader will observe one or two passages which the author, had he been spared to read the proof, would undoubtedly have changed, so exacting and critical was his sense of propriety in such matters. We have preferred, however, for reasons that will readily suggest themselves, to leave the article unaltered, and to present it to our readers just as it came from the author's hand. —Ed.]

The reopening of the question of venesection by Prof. Barker, before the County Medical Society, is important and timely. How rarely we bleed in Bellevue may be known from the fact that, when last on duty, having directed that a primipara with eclampsia should be bled, the members of the house-staff in immediate attendance had never seen the operation, and so I performed it myself. Now, while convinced that the abstraction of blood is a therapeutic measure which can never be entirely superseded with our present resources, I

[1] See note on last page of this number of the Journal. The note was received too late for insertion at this point.—Ed.

would dread to see any tendency toward the revival of the former reliance on *venesection.* Far safer and better for humanity, in my opinion, would it be to refuse it in every case. Unfortunately, in therapeutics, the cautious and wise restrictions which the expert places around an heroic method of treatment are lost sight of by the eager followers, who remember the remedy, and learn the restrictions with time, and the injury done to others. I have endeavored for years, with the best ability that I could command, to impress on my classes my conviction that, whenever in a question of treatment a spoliative or debilitating question came up, a special and grave responsibility rests on the physician, which does not necessarily accompany the decision of other therapeutic methods. In this to doubt is to decide against the use. The rapid decision to save life, the free venesection, and *then* the rapid improvement, may well be the *post* and not the *propter hoc.*

When suddenly powerless from hemiplegia last summer, and lying *conscious* near the bedside of a patient where I had fallen, one of three most esteemed and valued medical friends, who were present, advanced with a bandage, and proposed to bleed me; which I declined, putting my well and proximal arm under my back at the same time. Now, shortly after, as I was informed, my full and bounding pulse abated, and the indication for venesection thus spontaneously subsided. Now, let once the old tendency to venesection be revived, and with the custom will again come the old abuses, the old Sangrado reminiscences; and the old assignment of results to a cause so often proven fallacious. My fear of this is equal to Holmes's Dr. Gray:

> "But sleep once more till thirty years come round,
> You'll find the lancet in its honored place,
> Leeches and blisters rescued from disgrace," etc., etc.

It is the abuse, the inevitable abuse to be dreaded in the revival of a practice in the hands of the beginner, the thoughtless and the ignorant, that is to be dreaded, and not the use in few and appropriate cases by the skilful and experienced. Far better would it always be for humanity, if surgical-instrument shops and physicians' pockets continued to be unprovided with lancets, than that we should revert to the old doctrines and the old customs.

There is probably no disease in which venesection will always be more advisable, in well-selected cases, than in those of puerperal eclampsia sketched by Prof. Barker. Nor have I bled in others, in a practice including, among other opportunities, sixteen years of service in Bellevue Hospital. Yet, experience at least has certainly shown that the natural apprehension of apoplexy, on which he bases an argument for venesection, is statistically but seldom realized. Nor can it be claimed that this is due alone to venesection. Look through the records of autopsies and personal experience, and recognize the fact. Personally, I can just now recall but one case on autopsy, and one lady who came under my care, blind from this result. Before we knew the renal relations, it is interesting to note the steady and unfruitful study of the brain in fatal cases of eclampsia. In one of my early cases, typical, and in which I bled, I was deeply impressed with the pallor of the brain, and even of the choroid plexus. It has often come into my mind at the bedside since, and I believe with benefit.

The difficulty of distinguishing between anæmic and plethoric conditions was discussed at the meeting of the Society. No allusion was made to the venous hum which is often of such value; or to the results of an ophthalmoscopic examination, or the microscopic examination of the blood. I am sure that I have been guided correctly in doubtful cases by these aids. A very well-colored, red-lipped, and bright-eyed lady just from the country, and horseback exercise, consulted me for disease of a perfectly healthy heart, and when I advised iron for a musical venous hum, it was evident that she doubted the advice, though the iron speedily cured her symptoms. With regard to country practice I do not speak, but as regards practice in this city I confidently appeal to all whether tonics, an improved hygiene, and the recognition of anæmia or its tendencies, are not the daily need and daily panorama. Fancy the danger of a return to the old-fashioned abuse of the lancet in such a community! In my opinion, the abstraction of blood by leeches or cups is a much safer custom than by the lancet, which should be restricted to such imminent and typical cases as those alluded to in the discussion. By all means, when venesection is determined upon, let the graduated basin

be used; and let us all devoutly hope that the time has at least gone by when the eloquent and earnest lecturer shall impress, on the note-books and brains of those about to graduate, those words which have done such harm to the world—

"Pleno rivo, ad deliquium."

The cautious abstraction of blood in plethoric women, whose menopause has come too soon or too suddenly, or whose condition rebels by unmistakable signs against the deprivation of an accustomed outlet, will sometimes be necessary until our therapeutics have advanced beyond their present limits. Some of these patients find most relief from leeches to the uterus, but, as a rule, I prefer to apply them to the epigastrium. A good way is, to cut out from an apple space sufficient for three or six, and, placing them within, to hold the apple over the epigastrium until they have taken hold, which they generally do without delay. A well-known and witty woman, for whom I recommended this treatment in consultation, has often sung the praises of what she calls a "pomme aux sangsues."

In regard to post-partum hæmorrhage, if there is any thing of which my experience has convinced me, it is that he is the best practitioner who the most promptly and the most certainly insures for all parturient women that speedy tonic, uterine contraction, the type of which is found in the healthy and fortunate primipara; that in lying-in hospitals the best rule is to make assurance doubly sure for multiparæ by ergot, and that a reliable preparation should be at least within reach of every woman who has been confined; and that the abstraction of blood, under these circumstances, should not contemplate its encouragement from the uterine channel.

These tempting topics are already beguiling me into longer discussion than I desired. What I wished to say was, that, recognizing in the continued poverty of our therapeutics that, while blood-letting is infinitely less necessary than formerly, it is still necessary, there is yet danger, from these discussions, of a return to those "good old times," when the lancet was the pocket-companion. Is it not the hope of the day, that, with improved therapeutics, we may rescue all those conditions,

in which bloodletting is still necessary, from this coarse, risky, and undesirable practice? And if veratrum, aconite, etc., etc., do not always serve, have we not much to hope for yet from galvano-therapeutics, the intelligent application of heat and cold, and other external treatment, as well as from new remedies, which shall do for the circulation more even than bromide of potassium and chloral have done for insomnia? That such good fortune, and not a return to the practice of the past, may be the medicine of the future, is, I am sure, the hope of us all.

ART. III.—*Color-blindness, and its Acquisition through the Abuse of Alcohol and Tobacco.* By RICHARD H. DERBY, M. D., late Assistant-Surgeon of Prof. von Graefe, at Berlin.

ACHROMATOPSIA, akyanopsia (Goethe), anerythropsia, or Daltonism, are but a few of the names that have at various times been applied to color-blindness.

In the text-books we find cases of this affection cited as literary curiosities. It was believed to be nearly always congenital, and not amenable to treatment.

Modern investigators have immensely enriched this previously barren field. Color-blindness has been found an almost constant accompaniment of certain diseases of the optic nerve and retina. Excessive use of alcohol and tobacco is now known to produce color-blindness over a portion or the entire extent of the visual field. Exposure to wet and cold may lead to the same condition.

In many cases of amblyopia, an examination of the perception of color reveals functional changes most marked, and indeed in many cases, where the ordinary tests would indicate no pronounced difference in the acuteness of vision in various portions of the visual field, we find a most clearly-defined central color scotoma.

The question may be asked, If color-blindness is so constant a symptom in certain forms of amblyopia, why is it that patients so rarely complain of it? The explanation is undoubtedly in the fact that "the simultaneous falling off of the

acuteness of vision appears to them relatively a far more grievous affection, and a disturbance in their perception of color seems natural. They are apt too to compare their present amount of vision with what their normal vision was by poor light.

"With deficient illumination at a certain point we lose the power of recognizing not only the outline but the color of objects: we distinguish only light from darkness. Consequently the attention of the patient is only drawn to his color-blindness in those cases where it is very pronounced, and where, on the other hand, the amblyopia is slight.

"The fact that color-blindness and amblyopia are not necessarily associated together is reason enough that the condition of the perception of color should be especially examined in affections of the eye; such an examination may reveal us facts striking and unexpected, of importance for our diagnosis and prognosis."[1]

A brief *résumé* of accepted doctrines with reference to the perception of color may aid us in the appreciation of departures from the normal standard.

According to the theory of Young, the retina contains three varieties of nerve-fibres. Irritation of the first produces the sensation of red, irritation of the second that of green, and irritation of the third that of violet.

Homogeneous light excites these three classes of fibres with an intensity proportioned to the length of its undulations. The one class is particularly impressionable to the most excursive undulations—to the rays which produce the subjective sensation of red.

The second class is impressionable to the less excursive undulations, which cause the subjective sensation of green. Finally, the last class is impressionable to the least excursive undulations, which give the subjective sensation of violet.

Still, every spectral color excites each class of fibres, but with different degrees of intensity.

The simple red excites intensely the red percipient fibres, and weakly both the other classes, the sensation being red.

[1] Leber, Archiv f. Ophth. xv., 3, p. 28.

Simple yellow excites moderately the red and green, and weakly the violet percipient fibres, the sensation being yellow.

Simple green excites strongly the green percipient fibres, and much more weakly the two other classes; the sensation is green.

Simple blue excites moderately the green and violet, and weakly the red percipient fibres; the sensation is blue.

Simple violet excites intensely the percipient and weakly the other classes of fibres, the sensation being violet.

The idea of white is produced by an irritation equally intense of all the varieties of fibres, and that of black by an absence of all irritation.

Benedikt[1] was the first to draw attention to the great frequency of anomalies in the perception of color in amblyopia and amaurosis. Schelske[2] subsequently analyzed a case of atrophy of the optic nerve, and found red-color blindness.

At the last meeting of the Ophthalmological Congress at Heidelberg, Leber presented a paper on the occurrence of anomalies in the perception of color in disease of the eye; and later still, in the *Archiv für Ophthalmologie*,[3] the same author has published a more extended treatise on the subject, with the details of a large number of cases observed at Von Graefe's clinique, at Berlin.

In atrophy of the optic nerve, Leber found color-blindness an almost constant symptom. Out of thirty-six cases the perception of color remained intact in only three.

In simple amblyopia, without limitation of the visual field, where no ophthalmoscopical changes were observed, and where there was absolutely no central scotoma, color-blindness was very rare.

In amblyopia, with clearly-defined central scotoma, Leber found color-blindness a constant symptom, and he gives the following excellent description of this affection:

(It is hardly necessary to say that this is not the form of scotoma caused by changes in the outer layers of the retina in the region of the macula. It is a common form of amblyopia,

[1] Wiener Med. Chir., Rundschau, December, 1862, p. 211.

[2] Archiv f. Ophth. xi., 1, pp. 171–178.

[3] Archiv f. Ophth. xv., 3, p. 26.

and up to the last stage of the affection absolutely no changes are to be seen in the yellow spot.)

In the earliest stage the ophthalmoscope often shows no change in the fundus, or, at the most, hyperæmia of the disk and retina. Not infrequently at this period a slight, somewhat striped cloudiness of the boundaries of the papilla and the circumjacent retinal zone appears, not unlike a specific retinitis; occasionally isolated retinal hæmorrhages in the region of the disk appear. Often there are little bright, white opacities on the papilla or on its edge, which either conceal the point of emergence of the vessels or accompany them, sometimes covering them over, and again extending along the edge of the papilla. These opacities Von Graefe regarded as evidences of a retrobulbar neuritis of the optic nerve, which leaves but its last traces on the papilla.

At a later stage, and in some cases soon after the beginning of the disturbance of vision, the disk has a light-blue atrophic look, which is nearly always limited to its outer half. If hyperæmia and opacity have previously existed, they now both disappear. The inner half of the disk remains of its normal color and appearance and so characteristic is this ophthalmoscopic appearance, that *from it alone the central scotoma may be diagnosed.* [Since my attention was first drawn to this fact I have had frequent occasion, at Berlin and elsewhere, to recognize the truth of Leber's statement, and I have repeatedly traced out upon the blackboard a large central color scotoma in patients where the ophthalmoscope had revealed this partial atrophy of the papilla.] The examination of the perception of color now is a most convenient and sure method of recognizing this central amblyopia. In many cases the ordinary method of examination shows nothing abnormal, whereas the color-test reveals instantly a clearly-defined scotoma.

Leber's method is as follows: The patient is placed before a black-board at a distance of perhaps one foot and a half—one eye closed and the other fixing a white cross, traced upon the centre of the board. From the point of fixation now as a centre a small piece of colored paper (mounted upon a short rod) is moved, and the point at which the patient first recognizes the color is noted upon the board. In this way the region

over which the color is not recognized is mapped out. The most striking results are obtained from bright green and rose-red, the first appearing either white, gray, or yellow, and the last, blue.

In the less severe cases Leber found simple red-color blindness, while in the more advanced cases, as in those of atrophy of the nerve, the ability to distinguish colors diminished from the red to the violet end of the spectrum, and finally ceased altogether.

Leber found, further, if the cases are left to themselves, the affection for a considerable time grows worse, then remains stationary; all the time the partial atrophy of the papilla becomes more pronounced. The degree of the amblyopia varies, but in the majority of cases a moderate vision remains, sufficient to recognize large letters.

Almost always both eyes are affected. This form of amblyopia occurs almost solely in men; out of fifty-six cases only three were women. It is a disease of adults; its frequency increasing from the twentieth to the fortieth year. In a portion of the cases abuse of alcohol was certainly the cause of the affection, and in others the excessive use of tobacco undoubtedly contributed to produce the disease. Förster,[1] in a paper on the injurious action of tobacco on the vision, attaches still greater importance to this agent as a cause of amblyopia, supporting the views of Mackenzie, Sichel, Hutchinson, Lureiro, and others. The author cites twenty cases, in which there was a central scotoma, with a horizontal diameter of 18° to 25°, within which large letters could still be recognized. All of these patients suffered from some affection of the digestive and nervous system. Loss of appetite, constipation, loss of sleep, were common symptoms. Each one of the twenty patients was a strong smoker, and in eleven of these cases a very marked improvement was observed when the use of tobacco was given up.

In other cases, exposure to the cold and damp seemed the efficient cause of the disease. The frequency with which certain professions were affected with central scotoma gives

[1] Ein Jahresber. d. schles. Ges., p. 1868.

support to this theory, for, among the cases that Leber enumerates where an excessive use of alcohol could be proved, were three woodmen, a forest-inspector, a railroad-laborer, an engine-driver, and a turnpike-inspector, all of whom in the discharge of their duties were repeatedly exposed to such injurious influences.

From the absence of any complication with diseases of other organs, this is believed to be an idiopathic affection of the eye. Moreover, there is little or no doubt that the optic nerve, and not the retina or cerebro-spinal system, is the seat of the disease, for in these cases there are no changes observed in the macula as invariably are found in the later stages of chorio-retinal processes. The subsequent constant partial atrophy of the nerve, and especially the signs of inflammation on the papilla, as is found in some cases from the outset, point to an affection of the optic nerve.

"As to the nature of the process. Those cases that present the above-mentioned changes on the papilla are undoubtedly cases of neuritis, which gradually leads to atrophy of the optic-nerve fibres, an inflammation of the optic nerve between the chiasma and the eye. On the intra-ocular end of the optic nerve the last traces of the neuritis appear in form of loss of transparency of the edges of the papilla, signs of exudation along the vessels, and hæmorrhages.

"The partial white coloration, limited to the outer half of the papilla, is evidence of only partial disease of the optic nerve. To be sure, there is the same appearance in the first stages of progressive atrophy where there is no central scotoma, but it is much less pronounced. The explanation of this is that, in the outer portion of the papilla, toward the macula, there are only a small number of nerve-fibres, and therefore the disk at this point is less prominent; and commencing atrophy, even when it affects the entire thickness of the optic nerve, will, for this very reason, appear more marked and at an earlier date on the outer half of the papilla. In the pronounced cases of partial coloration of the papilla, as one almost invariably finds where there is a central scotoma, the difference between the inner and the outer half of the papilla is so great that there is no longer any doubt that the affection

is a partial atrophy of the optic nerve. The nerve-fibres which terminate in the region of the macula and between it and the papilla must lie in the outer half of the disk, for those fibres ending on the other side of the macula curve in the papilla itself obliquely upward and downward, and take a direction in the retina bow-shaped about the macula." . . .

The nerve-fibres going to the macula are the most superficial fibres of the optic, whereas, the nearer the periphery the retinal elements lie, just so much nearer the axis of the optic nerve are the fibres supplying them.

"If we now regard the central scotoma as dependent upon an affection of the superficial layers of the optic nerve or upon a perineuritis, which penetrates only to a limited depth in the nerve, we have an explanation of the precise limitation and central position of the scotoma; this theory would harmonize with the partial or complete recovery from the affection and its infrequent rheumatic origin."

If the periphery of the visual field in these cases has remained a long time intact, there is absolutely no danger of complete blindness; on the other hand, if the scotoma is greater in one direction, and if there is a peripherical defect in the visual field, then the case is one of atrophy of the optic nerve, and there is every reason to fear total loss of sight.

As for the prognosis in these cases of central scotoma, we cannot always hope for a *restitutio ad integrum*. The results attained by treatment are less favorable in general than in cases of simple amblyopia where there is no central scotoma. In the severer cases we can hope for a great improvement, and this may be of various kinds—the patient learns to see eccentrically, or, as we sometimes see, small breaks occur in the scotoma, and it is changed into a "ring scotoma," and this last issue is far better than where the vision is eccentric.

The treatment consists in local bloodletting and diaphoretics. Iodide of potash Leber found of service in cases where other measures had failed. Von Graefe applied a seton to the nape of the neck if there was a congestive disposition, and, when the inflammatory processes were over, the eyes were exercised with convex glasses and prisms.

Clinical Records from Private and Hospital Practice.

I.—*Tracheotomy in Croup; Recovery. With Remarks.* By J. D. Trask, M. D., Astoria, N. Y.

The following case of recovery, after the operation of tracheotomy for croup, may be interesting in connection with the cases of croup, and the communications in regard to its treatment, that have recently appeared in this and other Journals:

May 16, 1868, I was called at six o'clock P. M. to see a little German girl, eight years old. On the 13th she was taken with a cold, accompanied by hoarseness. On the evening of the 14th, according to her parents' account, she had been allowed to stand in the open air, watching what was going on outside a circus, and during the night and following day she was seriously sick. Medical advice, however, was not sought until the time of my visit, when the disease had continued at least seventy-two hours.

I found her with stridulous and very laborious respiration, her appearance being indicative of great distress. On examining the fauces, a few small, white spots were perceptible upon the tonsils; pulse 120 and of good strength; skin not above natural temperature, and bathed with perspiration. An emetic of turpeth mineral was ordered, which was to be repeated if necessary, until free vomiting should be induced.

I was unable to see her again until 11 P. M. During my absence there had been great increase of dyspnœa; there was constant tossing about the bed; the countenance ashy, the lips beginning to be blue, and the voice almost extinguished, while the lungs were apparently free from disease. During the following hour the atmosphere of the room was charged with vapor, and the spray of lime-water administered by inhalation. This last increased the dyspnœa so as to cause her to cry piteously for help. The urgency of her condition had become extreme, and there was every appearance of impending death from suffocation. The parents consented to the performance of tracheotomy, and, during a necessary absence of a few minutes, she asked impatiently, but in whispers scarcely audible, for the operation. A few minutes after midnight she was placed on a table with the limbs confined closely by a towel. The light of a study-lamp displayed distinctly the features, of an ashy hue, the lips now quite blue, pupils largely dilated, and but moderately sensitive to light.

In opening the trachea considerable delay was caused by free venous hæmorrhage. During the operation the child was apparently unconscious, and after its completion respiration became very rapid, the pulse less and less strong, the pupils alternately contracted and dilated, and there was convulsive action of the limbs. The jaws were fixed, but whiskey and water were poured between the teeth, and when after a little time this was swallowed, a convulsive cough took place, and a piece of false membrane

one inch by an inch and a half, together with several smaller pieces, was expelled through the artificial opening. Whiskey was now freely given, each act of swallowing causing the expulsion of bright, frothy blood, and portions of membrane. At last consciousness returned, with renewal of the oxygenation of the blood. A stitch was passed into each side of the incision in the trachea, and the ends of the thread tied behind the neck.

Not regarding the disease as of a diphtheritic character, on the 17th I gave three grains of calomel with Dover's powder in divided doses, with beef-tea and a little stimulus. Respiration was hurried, the pulse from 130 to 140; elixir of opium was given to secure sleep.

On the morning of the 18th there were two or three dejections from the calomel. There were small but distinct diphtheritic patches on the fauces, different from what had been first observed, and presenting the wet chamois appearance. A similar exudation covered the entire surface of the wound. The powders were withdrawn, and the patient put upon eight drops of muriated tincture of iron every four hours, with plenty of beef-tea and whiskey. The persulphate of iron diluted with three parts of water was applied to the fauces and to the surface of the wound, and within the orifice in the trachea. In the afternoon the surface of the wound had cleared off, and respiration through the opening had become much easier, but the patches were still visible on the tonsils. The persulphate of iron coagulated and rendered friable the exudation, so that it could readily be removed.

On the 19th the pillars of the fauces were covered with exudation, and the interior of the trachea so far as could be seen. The exudation apparently extended down into the right bronchus, inasmuch as but a very small amount of air entered the right lung, as was ascertained by repeated examinations, while percussion remained clear, respiration being much hurried. In the afternoon I found her asleep, breathing easily but still somewhat hurriedly, with pulse at 120. The air now entered the right lung more freely, and a portion of false membrane was shown which had been expelled.

From this date convalescence was not interrupted by any serious occurrence. A tracheotomy-tube was introduced very soon, and the repulsive appearance hitherto presented by the gaping wound thus removed. For several weeks after the closure of the opening in the trachea, the voice of the child remained very feeble and extremely husky, and did not recover its previous characteristics for several months.

A few points of a practical character present themselves in connection with this case.

When called to the child, I ordered emetic doses of the turpeth mineral. As this remedy has been recently brought to the notice of the profession by Prof. Barker,[1] with a state-

[1] See paper by Fordyce Barker, M. D. American Journal of Obstetrics, etc., Vol. III., No. 1, May, 1870.

ment of success attending its employment that will command general attention, it may not be amiss to add my own testimony to its efficiency and usefulness.

The use of the turpeth mineral as an emetic in croup was first suggested, at least in a way to challenge attention, by Dr. Hubbard, of Hallowell, Maine. In a letter read before the Philadelphia College of Physicians, October 7, 1845,[1] Dr. Hubbard writes that he was led to its employment from a want of some article, reliable as an emetic, that should be also safe and particularly free from liability to induce purging. He alleges that the turpeth mineral is more prompt and certain than any other remedy within his knowledge. "It usually acts in ten or fifteen minutes, and the dose should be repeated at those intervals, if the first fails, which rarely happens. . . .

"Its emetic operation usually continues from an hour to an hour and a half, accompanied and followed by none of the distressing nausea, prostration, and depletion of antimony, but on the contrary leaving the patient with the invigorated feeling arising from equalized warmth and circulation."

I early became acquainted with the advantages of this remedy, and for at least twenty-five years have kept it within easy reach; and until within a very few years have rarely, if ever, treated a case of croup without its employment. I cannot claim, with Dr. Barker,[2] that I have not lost a case in which it was resorted to, but I have rarely failed to see decided benefit follow its use. The promptness with which it acts, the certainty with which it may be relied upon in a disorder in which the difficulty of producing emesis is often very great, and the freedom from subsequent unpleasant depressing influence, commend it beyond all other remedies usually resorted to for producing emesis. The tendency of late years has unquestionably been to discourage the use of emetics in croup, at any rate as a matter of routine, on the ground that they can only be employed with advantage to promote the expulsion of false membrane after it has become detached.

It can hardly be questioned, however, that experience has

[1] American Journal of Medical Sciences, January, 1846.

[2] "During the twenty years that I have practised in this city, I have never lost a case from croup."—*Loc. cit.*

shown that they are highly useful in the earliest stages of the disease, and that there is every reason to believe that in not a few instances they break up a train of morbid sympathies, which if not interrupted would result in the production of the fully-developed disease. It is doubtless true that but a small proportion of cases to which a physician is called would, if left alone, assume a severity endangering life; but the difficulty is in distinguishing such from those that would recover if left alone. I believe most practitioners would sympathize with Dr. Barker in his failure to distinguish between the catarrhal and true croup of writers. I am impressed with the belief that in cases of what is called croup, excluding, of course, that which is purely spasmodic, there is every shade of inflammation, from the simple catarrhal variety, with tumefaction of the mucous membrane, and increased secretion of mucus, to the graver forms, accompanied by plastic exudation; and that the prognosis and treatment depend on the extent and degree of the inflammation.

I have not felt called upon to administer an emetic in every case of croup. Pretty active counter-irritation, as by the application over the larynx of a single thread of woollen yarn which has been wetted for about an inch midway its length, with spirits turpentine, and tied behind the neck, will in a great many cases of simple catarrhal croup be followed in a very short time by a marked subsidence and early disappearance of the symptoms. Of late years I have given this a trial in most cases before resorting to emetics.

I have rarely repeated the emetic after free vomiting has been induced, in many cases because it has not been required, and in other instances lest the disturbance of the digestive organs might do more harm than good. When the emetic has failed to give relief, dependence has been placed in the main, during the further conduct of the case, upon inhalations of warm vapor and the use of Dover's powder, with occasional resort to veratrum or aconite, with proper regard to the support of the patient's strength.

I would here take occasion to refer to the use of calomel in large doses, which Dr. F. D. Lente,[1] of Cold Spring, has re-

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cently had the courage to avow, and to recall to the attention of the profession.

The sedative and antiphlogistic influence of large doses of calomel in inflammatory diseases of the digestive tube may be regarded as well established by the experience of Ainslie and Johnson, and in croup, by that of Hamilton, of Edinburgh, Dr. Stearns, of New York, and others, who have followed in their steps. Pereira declares himself unable to reconcile, with the opposite experience of those just referred to, the occasional instances of dangerous intestinal irritation from the use of calomel in this manner; and these cases would seem to be purely exceptional. The power of calomel, in doses of from twenty to forty grains, to allay the distressing tenesmus of epidemic dysentery and to put a stop to the discharges, and its antiphlogistic influence in laryngo-tracheitis, were well known to most well-informed practitioners five-and-twenty years ago. The evil effects following the abuse of calomel in some parts of our country, in connection with the tendency that has prevailed of late years to discourage energetic or "disturbing" medication, have conspired to almost entirely suppress the use of calomel in large doses, or, it may almost be said, of calomel at all.

The great experiment upon the *restorative powers of Nature*, which during a series of years was practised by the disciples of the Hahnemannic school, and still is by those who follow the precepts of its founder, has taught the profession that the tendency in the vast majority of cases of sickness is, under favoring hygienic influences, to spontaneous recovery; and that the proportion of cases in which the advice of a physician is sought, in which agents of real potency are required in order to save life, is very small. This experiment was in progress just so long as their medication was limited to medicines void of all properties that could be appreciated by the senses. It was an experiment which conscientious physicians never could have dared deliberately to carry out, but which has been performed to hand by those who, while dealing in infinitesimals, were happily able to convince themselves and their patients that they were giving and taking medicine in truth.

That there is, however, a certain proportion of cases in

which Nature becomes hopelessly embarrassed in her efforts to bring about a cure, and in which experience has shown that Art possesses resources which may be brought to the assistance of Nature, is the belief of all who have any faith whatever in the beneficial influence of remedial agencies. This is evidenced by the appeal which we have reason to believe is made, in cases of extremity, by practitioners of every name, to agents whose influence over the natural processes is indisputable. Admitting the possibility that calomel in large doses may do harm, though the risk is certainly very small, does not this seem to be incident to nearly all great agencies for good—and in cases in which the more usual means have failed to give relief, and danger to life is imminent, is not this well worthy of more general consideration? Although remarkable cases of spontaneous recovery from membranous croup have occurred even when life had seemed to be extinct, there can be but little doubt that, but for the opening of the trachea, this child would have died. I am at a loss to understand how any one under such circumstances could allow the possibilities of danger from the operation itself to deter him from a resort to it.

This case is also interesting, as bearing on the question of the identity of membranous and so-called diphtheritic croup. The appearance of the tonsils when first seen was precisely what is seen in common follicular tonsillitis, and I did not suspect that I had a case of diphtheria to deal with, until after the prostration incident to the fearful experiences that preceded the operation had taken place; after this, true diphtheritic exudation appeared in the air-passages and on the surface of the wound. The experience of others will doubtless furnish many similar cases.

In this child's case there can be no reasonable doubt that the exudation passed into the larger bronchial tubes of one lung, almost entirely obstructing their calibre, and causing nearly entire exclusion of atmospheric air.

In another case, a fine boy, five years old, had copious exudation upon the fauces. There had been no cough nor symptom of laryngeal or tracheal difficulty until the fifth day, when, on returning, after an absence of a few hours from the city, I found that he had been seized with suffocation, and that a

neighboring practitioner had been called in, and had very promptly performed tracheotomy. Life was prolonged for several days, and on examination after death the air-passages were found lined with exudation almost to their ultimate ramifications.

II.—*A Case of Poisoning by Strychnine, treated with the Bromide of Potassium; Recovery.* By W. W. Hewlett, M. D., Babylon, L. I.

E. S., aged thirty, a farmer by occupation, took by mistake five grains of strychnine, that he had procured for the purpose of killing rats, on the evening of November 14th. Immediately after which he retired, and slept nearly two hours. He then awoke, "feeling very much confused, and as if something wrong was going to happen." Pains in the abdomen and twitchings of limbs soon ensued, followed by violent tetanic convulsions and opisthotonos. The patient was of very intemperate habits, and, as I had given him the elixir of opium to quiet muscular tremor and the restlessness of alcoholism, the friends gave him the elixir at that time, attributing his convulsions to the same origin. The remedy affording relief, it was administered as he called for it. He took six teaspoonfuls in the course of two hours. Nausea and vomiting soon ensued, after which he felt better, and remained quiet for two or three hours. The pain and spasms coming on again, he drank freely of water, in order to produce the vomiting that afforded so much relief before. He continued in this way until 5 A. M., imbibing freely of cold water, and vomiting profusely, alternating with violent tetanic convulsions; at this time the paper which contained the strychnine was found, and the doctor sent for immediately.

I found him unable to move the extremities, intellect clear, head drawn forcibly backward, and suffering the most painful and violent spasms, that were provoked by the slightest attempt to move, the entrance of any person in the room, or the closing of a door. Ascertaining that he could swallow (but with great difficulty), and remembering the history of a similar case, treated successfully by the bromide of potassium, which was reported in the last number of the *American Journal of*

Medical Sciences, by Dr. Gillespie, I prescribed it as a *dernier ressort*, in doses of ninety grains or more, every half hour. In twenty minutes after the administration of the first dose there was perceptible improvement, which continued. In two hours he could move his arms. The bromide was then given at the rate of one drachm every hour; but, the convulsions coming on again with greater severity, the remedy was given for one hour every fifteen minutes. At the end of that time he felt easier again, and the bromide was continued in smaller doses, at intervals of a half-hour to two hours, according to circumstances, during the day and following night. In thirty-six hours from the time that the bromide was first given he was walking about, feeling a little weak, and occasionally a slight twitch.

Concerning this case there are several important points that it would be well to note:

1. The length of time that elapsed before the effect of the poison was manifest.
2. The marked tolerance of opium.
3. The relief that the vomiting afforded.
4. The antidotal power of bromide of potassium.

The naked facts only are presented; my professional brethren may draw their own inferences.

III.—*Injury of the Hip-Joint.* Reported by A. D. Hull, M. D., New York.

I was called to see this case under the following circumstances:

F. B. Van V——, of Lansingburg, New York, a blacksmith by trade, aged sixty-seven years, height six feet one inch, weight one hundred and sixty pounds.

On the 10th of July, 1868, this man was standing on the floor, stepped backward and fell through a cellar-door, a distance of about seven feet, fracturing obliquely his right thighbone near the trochanter major. He was attended by another physician, and I saw him once only in consultation soon after the injuries.

The result of this inquiry was not very satisfactory; the limb, though in good position, hanging naturally, was fully one

inch and a half shortened. This, no doubt, was caused by the patient frequently loosening the extension when the limb was painful, as I was informed by the attending surgeon.

This man I often saw about the streets after his recovery (I was then a resident of the place), and had particularly examined the length of the limb in comparison with the other, for my own satisfaction, previous to the accident which I am now about to relate.

On the 2d of January, 1870, while out walking in the streets (they were covered with ice), he slipped and fell at length, striking on his *left* hip, rendering himself unable to get up, and causing great pain. This occurred near a homœopathic physician's office, and the physician came to his relief.

The next day I was called in to give my opinion as to what was really the character of the injury. I found the patient lying on the bed, upon his back, with the foot of the injured limb turned out considerably more than what seemed natural, the length of the limb compared with the other the same as before the injury, viz., an inch and a half longer.

When I took hold of the limb to make an examination it produced intense pain, the least movement being completely unendurable. I then chloroformed the patient, and made what I considered a most thorough examination, first by gentle movements, expecting to hear crepitus at or near the neck of the thigh-bone. Nothing of the kind could I detect. I then looked for dislocation, and most thorough movements did I make, flexing the limb, bringing it upon the body, rotating and manipulating it in the manner described by Dr. Read, to reduce dislocation of the hip-joint. On extending the limb no change was apparent, the movements were free and seemed natural, the length remained the same, nor was the pain increased by the severe usage. I recommended gentle extension, sufficient to take off the tension of the ligaments around the joint and relieve the bony surfaces from pressure, and hold the limb in position.

The next day, not fully satisfied with my own opinion, I called Dr. D. D. Bucklin in consultation, and went through the same manipulation, with same result. Not yet fully satisfied, the next day I called in Dr. George Hubbard, but no new discoveries were made.

I would remark, although this limb had been so vigorously handled, it was not particularly painful at any time except when an attempt was made to move it.

The next time I saw this man was about two months from the date of the last injury, walking in the street with his crutches, with his limbs apparently of the same length; he had dispensed with the false sole and high heel of his right foot, and wore shoes with the heels nearly of the same height.

Four months from this time he laid by the use of crutches; the motions of both hip-joints were now about equal so far as locomotion was concerned, as the right joint had been somewhat impaired by the previously-mentioned fracture of the thigh-bone.

The question is, What was the the nature of this injury? I confess it is much easier for me to point out what it was *not* than to tell what it was.

Four conditions might be present in a limb of that kind, either one of which might produce shortening under certain circumstances: 1. Contusion of the joint sufficient to produce severe inflammation, and thereby destroy the membranes and bones in connection, and finally absorption of the same.

In a case of this kind where the injury was of a magnitude sufficient to produce shortening as marked as in this instance, we would expect severe constitutional symptoms, such as fever, general prostration, and long confinement. This case was free from all of these symptoms; on the contrary, this patient was comparatively comfortable and able to take a free allowance of food. It will also be recollected that recovery took place, in two months from date of injury, sufficient to allow the weight of the limb to be borne on the sole of the foot, and the patient to walk with the assistance of crutches.

Does it seem credible that all these changes could have occurred in so short a time with such results?

2. Dislocation might produce shortening, but the limb would not hang naturally, the foot and toes would turn out, or in, which they did not in this case, and the rotary motion would be destroyed.

3. Fracture of the neck might produce shortening of the limb, but in this case it is only necessary to recollect that, to

shorten a limb an inch by this injury, the ends of the fractured bones would not come in contact, and therefore there could be no union.

4. Fracture of the thigh is often the cause of shortening of the limb. In this instance the means used to discover any injury of that kind were too thorough to leave any doubt in my mind; all the physical tests were applied that were thought proper, and no sign of fracture was detected, nor was there any such sign during recovery.

There is another state of things where the limb might be shortened, viz., by a fracture and destruction of the upper portion of the acetabulum with or without fracture of the head of the thigh-bone within the capsular ligament, allowing the head or neck to slip up above the socket and possibly forming an artificial joint, and consequently shortening; but the same objection applies in the case of contusion, viz., the impossibility of recovering from injuries so severe as to produce such results in so short a period of time.

IV.—*Cases from Private Practice.* By A. T. Wheelock, M. D., Belfast, Maine.

ACUTE RHEUMATISM.

Thirty years since, a case of acute rheumatism was observed by me, coming on in immediate connection with much anxiety and depression of spirits, and occurring soon also after the usual sudden suppression of the perspiration by cold. Since that time very many observations of my own, also those of other physicians, on their attention being directed to it, have pointed to the following conclusions, viz.: That every access of acute articular rheumatism is immediately preceded by a special mental condition of anxiety and depression, together with the severe cold always accompanying. At different periods, cases illustrating this proposition have been communicated and published in medical journals in New York, Philadelphia, and Paris, and, in every direction that my observations, reading, and inquiry have availed, nothing has been seen calculated to controvert it. So few observations have been made illustrating the *rationale* of the production of any

given disease, that the subject has been intensely interesting to me, and, on reflection, may be seen to be of practical application and of much importance as a prophylactic of a common disease, and in regard to the treatment of it. A few cases of recent date are selected from among the many that have been noted by me, and herewith given in explanation of the idea of the above-stated proposition:

Observation I.—R. W., a carpenter, aged thirty, married, much pressed by business, and behind time in his work, was unexpectedly deprived of his workmen in consequence of a strike for higher wages. After going about town in much haste for hours in search of some assistants, while in a state of extreme perspiration, he went into a partially-finished building and worked half the day in a strong draft of wind, fitting in doors and windows. Three days after he had a severe attack of acute rheumatism, continuing several weeks.

Observation II.—C. R., trader, aged twenty-six, married, emigrated to Ohio and commenced trade; was very successful, and in a few years acquired a competence, and was in circumstances favorable to properly bringing up and educating his family of three children. Two of his children died suddenly with diphtheria, and about the same time his store and goods were destroyed by fire, and uninsured. At this period, on returning to his former home, he experienced a severe cold in consequence of careless exposure, while his mental anxiety and distress were excessive, and, within a few days after, had a severe attack of acute rheumatism.

Observation III.—S. F., female, aged thirty-two, married, held a reception of friends at her house. From various reasons she was exceedingly anxious that the entertainment should pass satisfactorily and successfully. During a considerable part of the evening she stood in a draft of air in attending to her duties as the hostess of the occasion. She was aware of experiencing a serious suppression of the perspiration at this time, and three days after she had the commencement of a violent attack of acute rheumatism.

Observation IV.—G. R. B., aged twenty-eight, unmarried, lieutenant in U. S. Navy, of a sanguine, excitable temperament, was preparing for examination as a candidate for promotion. He studied very closely for several months, was depressed in spirits, and in great anxiety in regard to his success at the coming examination. At this time, in consequence of exposure in a storm, he was subjected to a violent cold from remaining in wet clothing. The attack of acute rheumatism following was of long duration.

In the course of the treatment of cases of acute articular rheumatism, it has been observed that, on the cause of it being understood by an intelligent patient, after an explanation cor-

responding to the above-enumerated ideas in reference to the disease, their correctness has been admitted, and encouragement, derived from such a comprehension of it, seemed to assist in the cure.

OXYGEN IN DISEASE.

In the number of the New York Medical Journal for April, 1870, is a critical, scientific, and thorough article on "Oxygen as a Remedy in Disease," which delighted me exceedingly, all the statements being candid, logical, clear, and satisfactory; indeed, a very fine specimen of medical testimony. To this article my experience can add some facts, which may simplify the practical application of those ideas in locations where it would be likely to be much more inconvenient, than in the city of New York, to obtain the oxygen-gas in a pure state. It is perceived by this article that in the application of the oxygen, as recommended, it is almost always used in a mode that will secure its dilution. For many years, in incipient stages of fevers of different types, headaches, and various kinds of *malaise*, resulting from an imperfect state of the circulation of the blood, it has been recommended by me to breathe, during several minutes, as much air as possible, with so much success that it has been denominated by me as the breath-cure. It is recommended to make the expirations, as well as the inspirations, through the nose, vigorously, continuously, and with sufficient rapidity to accomplish the result of expanding the lungs thoroughly, breathing as large an amount as possible for perhaps fifteen minutes, if relief is not sooner obtained.

CHLORAL HYDRATE IN PUERPERAL CONVULSIONS.

Two cases of puerperal convulsions have occurred in my practice within the past year, in both of which the chloral hydrate was used successfully. The chloral was prepared as follows: one drachm in three ounces of simple syrup; dose, a tablespoonful every hour. The first dose produced a marked effect in lessening the violence of the symptoms. As the treatment proceeded, in the one case the feet were immersed in hot water, in the other case strong mustard-draughts were applied to the feet; a very important part of the remedial

measures. As the disease, in its terrific violence, seems to suddenly attack the brain, like metastasis, active counter-irritation to the extremities would of course appear indicated with a great deal of urgency.

Proceedings of Societies.

MEDICAL SOCIETY OF THE COUNTY OF NEW YORK.

Special Meeting, December 19, 1870.

DR. ABRAM JACOBI, President, in the chair.

APHASIA.

DR. WILLIAM A. HAMMOND read an extended paper upon this subject, of which we present an abstract.

The term *aphasia*, in its broadest sense, indicates a morbid condition in which the ability to express ideas, whether by words spoken or written, or by gesture, is impaired or destroyed; and this, whether the impairment or destruction be due to want of power to recall and retain in the mind the symbols of thought, or to want of control over the muscles which should be called into action to express them. These two classes of cases, though at first confounded, are, of course, widely different; and, when they came to be distinguished, those in which the patient cannot recall at will the symbols of thought were designated cases of *amnesic aphasia;* while those in which, though recollecting, he cannot express them, from paralysis or incoördination of the muscles of articulation or expression, were called cases of *ataxic aphasia.* At present, when the word aphasia is used alone, it must be understood as referring to the amnesic form, and as having special regard to spoken or written language (or to the language of gesture so far as this is arbitrary and conventional rather than instinctive).

Aphasia, then, as defined by the speaker, "is a condition produced by an affection of the brain by which the idea of language, or of its expression, is impaired. . . . It does not include those cases in which the individuals are able to speak,

but will not, such as are met with among the insane and the hysterical. . . . Neither does it embrace cases of inability to speak from paralysis of the tongue or other muscles of articulation." It is also to be distinguished from aphonia, in which "the idea of speech is undisturbed, and articulation is not interfered with except as regards phonation. Aphonic patients can whisper, but are unable to speak in full voice, owing to some laryngeal affection impairing the tone of the vocal cords."

The fact that the faculty of speech may be deranged independently of the will, of paralysis, or of loss of voice, attracted early notice, as shown by quotations from Isaiah, Thucydides, Pliny, and Suetonius. Passing over intermediate writers, Crichton, in 1798, clearly describes cases of the affection coming under his own observation, and cites a number of others from German authors. In 1812, Dr. Rush, of this country ("Medical Inquiries and Observations upon Diseases of the Mind"), refers specifically to various forms of aphasic aberration of memory, though his observations seem to have escaped notice. He says: "1. There is an oblivion of names and vocables of all kinds. 2. There is an oblivion of names and vocables, and a substitution of a word no ways related to them. Thus, I knew a gentleman afflicted with this disease, who, in calling for a knife, asked for a bushel of wheat. 3. There is an oblivion of the names of substances in a vernacular language, and a facility of calling them by their proper names in a dead or foreign language. . . . 4. There is an oblivion of all foreign and acquired languages, and a recollection only of vernacular language. Dr. Scandella, an ingenious Italian, who visited this country a few years ago, was master of the Italian, French, and English languages. In the beginning of the yellow fever, which terminated his life, in the city of New York, in the autumn of 1798, he spoke English only; in the middle of his disease he spoke French only; but on the day of his death he spoke only the language of his native country. 5. There is an oblivion of the *sound* of words, but not of the letters which compose them. I have heard of a clergyman in Newburyport, who, in conversing with his neighbors, made it a practice to spell every word that he employed to convey his ideas to them. 6. There is an oblivion of the mode of spelling

the most familiar words. I once met with it as a premonitory symptom of palsy. It occurs in old people, and extends to an inability, in some instances, to remember any more of their names than their initial letters. . . . 7. There is an oblivion of names and ideas, but not of numbers. We had a citizen of Philadelphia, many years ago, who, in consequence of a slight paralytic disease, forgot the names of all his friends, but could designate them correctly by mentioning their ages, with which he had previously made himself acquainted." Dr. Rush remarks of these cases, that "there appears to be something like a palsy of the mind, *quoad* these specific objects."

Thus far there had been no attempt to define with precision the seat of the faculty of language, or even to establish its existence. But early in the present century Gall was led by his observations to infer the existence of such a faculty, and to locate it in those convolutions of the brain resting on the posterior part of the supra-orbital plate. This was the beginning of his system of phrenology.

Gall had adduced, in support of the theory that there is an independent faculty of language, two cases, in which this faculty was lost without other impairment of the memory. In 1825, Bouillaud brought forward a large number of such cases; and upon a basis of sixty-four autopsies of brain-lesions—which in the aphasic cases had proved to be invariably located in the anterior lobes, in the non-aphasic, elsewhere—he announced his adhesion to the view that the function of articulate language was presided over by a separate faculty of the mind, and that its organ was located in the anterior lobes of both hemispheres. Bouillaud first clearly brought out the distinction between amnesic and ataxic aphasia, "dividing the faculty of speech into two distinct categories of phenomena: 1. The faculty of creating words as representatives of our ideas, and of recollecting them—internal speech. 2. The power of coördinating the movements necessary for the articulation of these words—external speech." His patients, many of them, exhibited no other symptom of cerebral disorder than the loss of the power of language. They preserved their intelligence; comprehended perfectly questions put to them, and knew the value of words; but, although there was no paralysis of either

tongue or lips, they were unable to utter a word. The lesions in these cases were, as above stated, always in the anterior lobes.

Bouillaud's position was violently assailed by Cruveilhier, Andral, Lallemand, and others, who reported opposing cases. He stoutly maintained it, however; brought up the total of his cases to one hundred and three in support of his doctrine; and offered a prize for any case of profound lesion of the anterior lobes without troubles of speech. Further to fortify his ground, he performed some experiments upon dogs, which, however, can hardly be taken as satisfactory. But unintentional experiments have been performed upon the human subject, which tend to show that, though the faculty of language may be located in one or both anterior lobes, yet either may be seriously injured without that faculty's suffering to any appreciable extent.

These cases we have not space to quote in full. One, now famous, is related by Dr. Harlow, in the *Boston Medical and Surgical Journal*, December, 1849, vol. xxxix., p. 389; by Dr. Bigelow, in the *American Journal of Medical Sciences*, July, 1850; and in the *Catalogue of Warren Anatomical Museum*, Boston, 1870, p. 145. On the 13th of September, 1848, a healthy man, twenty-five years old, was ramming down, with a tamping-iron, a charge of powder for a blast. The charge exploded and drove the iron through his head. The bar (which was upward of three and a half feet long by an inch and a quarter in diameter, and weighed thirteen and a quarter pounds) entered, by its upper, pointed end, at the left angle of the lower jaw, and, passing upward and inward, escaped about the site of the anterior fontanelle, being thrown to a distance of several rods. The man recovered and lived till May 21, 1861, exhibiting full command of language all the while, though changed in disposition. On his death, the skull was obtained for the Warren Museum. It shows that the left anterior lobe of the brain must have suffered severely, though the third frontal convolution and the island of Reil escaped injury.

Another case, almost as remarkable, is described in the same *Catalogue*, p. 149. A healthy, intelligent coal-miner, by an accident similar to the last, May 14, 1867, was trans-

fixed through the head by an iron gas-pipe, which entered at the junction of the middle and outer thirds of the right supra-orbital ridge, and emerged near the junction of the left parietal, occipital, and temporal bones. It remained projecting from the front and back of the head, and required considerable force for its withdrawal. In two months the man was walking about. In June, 1868, he was exhibited to the Massachusetts Medical Society, his mind considerably impaired, but not so as to exhibit to a stranger any marked deficiency during a few minutes' conversation. Here the right anterior lobe must have been seriously injured.

M. Peter (quoted by Trousseau, "Clinical Medicine," English translation, vol. i., p. 256) relates the case of a cavalry-man, who fell on the back of his head, fracturing the skull. In his delirium he talked incessantly, shouting the worst oaths, and holding connected conversations with the persons of his imagination. On his death thirty-six hours after, both anterior lobes of the brain were found disorganized in the whole thickness of their front part, from *contre-coup*, though the posterior lobes had escaped injury.

Other cases quite as conclusively prove the untenableness of Bouillaud's first position. Latterly, however, he has admitted that the organ of language may occupy not the whole of either anterior lobe, but the posterior part of it.

In 1836, Dr. Marc Dax propounded the view that the faculty of language was seated, not as Gall and Bouillaud had contended, in both anterior lobes of the brain, but only in the left anterior lobe. He founded this opinion on one hundred and forty cases of aphasia attended with right hemiplegia, in which the lesion causing the paralysis, and presumably the aphasia also, must of course have been in the left side of the brain. His paper attracted, strangely, little attention until rescued from obscurity by his son some twenty-seven years later.

Passing over, for the present, the many cases confirmatory of this view, and the few which seem to contradict it, we come to the famous discussion in the Anthropological Society of Paris, in 1861, where Auburtin, who stood forth as the champion of Bouillaud's views, was opposed by Gratiolet and Broca. In the course of the discussion reference was made to a

case of aphasia, complicated with right hemiplegia, then under Broca's care; and Auburtin agreed to renounce his position if the *post-mortem* did not reveal disease of the anterior lobes. This case was the now historical one of Le Borgne, or "Tan." (See account of it in Trousseau's "Clinical Medicine," English translation, vol. i., p. 243.) The man died, and the lesion was found in the left anterior lobe. More exactly, "it involved the inferior marginal convolution of the temporo-sphenoidal lobe, the convolution of the island of Reil, and, in the frontal lobe, the frontal transverse convolution, and the posterior half of the second and third frontal convolutions. The left corpus striatum was also affected. According to Broca, the disease had in all probability begun in the third frontal convolution, and gradually extended to the other parts, the paralysis marking the implication of the island of Reil and the corpus striatum."

This case determined M. Broca's conversion to the doctrine of localization in general, and to that of the localization of the faculty of language, in particular, where Bouillaud had placed it. Another, which occurred in his service soon after, led him to carry the doctrine to a further extreme than any of his predecessors had done. This second case "was that of a man named Le Long, aged eighty-four years, who had entered the hospital for a fracture of the neck of the femur. Eighteen months before, he had been treated in the medical service for a temporary apoplexy, which had deprived him of the faculty of speech, but had caused no paralysis. Le Long, whose intelligence, facial expression, and ability to gesticulate, were very striking, made himself perfectly well understood, although able to pronounce indistinctly a very few words, but which were nevertheless properly applied. These words were *oui*, *non*, *toujours*, *tois* (for *trois*), and *Le Lo* for *Le Long*. Thus, when asked, 'Can you write?' he answered, 'Oui;' 'Have you any children?' 'Oui;' 'How many?' 'Tois,' but at the same time, as if aware that he was not answering correctly, he raised four fingers. 'How many boys?' 'Tois,' raising two fingers. 'How many girls?' 'Tois,' holding up two fingers. 'What time is it by this watch?' 'Tois,' at the same time raising ten fingers to signify that it was ten o'clock.

'How old are you?' To this question he replied by two gestures; the one consisting of raising eight fingers, the other of four fingers, by which he meant that he was eighty-four years old.

"Aside from this application of the word *tois* to all numbers, his answers were perfectly correct. The tongue was neither paralyzed nor thickened; on one side, the larynx was mobile, and his limbs possessed their normal power for his age. It was therefore a case of pure aphasia, or, as Broca then designated the affection, aphemia.

"Twelve days after the accident, the patient died. The *post-mortem* examination revealed the existence of lesions, almost identical in situation with those of the former case. The posterior part of the third left frontal convolution, and the contiguous part of the second, had been absorbed and replaced by a serous fluid. Two cases can scarcely decide any point in pathology; but, without venturing to assert positively that the organ of language resides exclusively in the posterior part of the third frontal convolution, M. Broca expressed the opinion that the integrity of this convolution, and perhaps of the second, is indispensable to the normal operation of the function of speech.

"Many cases were adduced by Charcot, by Falret, by Perroud, of Lyons, by Trousseau, and others, in support of the localization of the faculty of articulate language in the left side of the brain. Most of these cases were accompanied by right hemiplegia, and, in several, *post-mortem* examinations showed the lesion to exist in the parts designated by Broca.

"In the early part of 1863, M. G. Dax, son of the M. Dax who had placed the organ of language in the left hemisphere, presented, through M. Lelut, a memoir to the Academy, in which he claimed, with his father, that aphasia was always the result of lesion of the left hemisphere; but he assigned a still more restricted position, by limiting it to the anterior and exterior part of the middle lobe. He cited forty cases of loss of the power of speech, coincident with lesion of the left hemisphere.

"Now, besides these direct cases, there are others which bear with almost as much effect on the affirmative of the doc-

trine in question. Thus M. Fernet, in 1863, presented a case to the Société de Biologie, in which there was left hemiplegia, but no aphasia. After death, softening of the right hemisphere, from thrombosis of the right middle cerebral artery, was found to exist. M. Parrot adduced another case in which there was complete atrophy of the island of Reil, and of the third convolution of the right side, but in which there was no trouble of speech. These cases go to show that the organ of articulate language is not situated in the right hemisphere."

M. Lesur has reported a very interesting case, where a child, trephined about an inch and a quarter above the left eye, lost the power of speech whenever pressure was made upon the brain through the opening, regaining it when the pressure was removed. A similar case had occurred in Dr. Hammond's own practice.

"Among British writers, Dr. Hughlings Jackson (*London Hospital Reports*, vol. i.) has given the history of thirty-four cases of loss of speech, coinciding with right hemiplegia. He is entitled to the credit of making a beautiful application of anatomy and physiology to the pathology of the subject under consideration. The part of the brain designated by Broca as the seat of the organ of articulate language is nourished by the left middle cerebral artery. An obstruction of this artery would of course interfere with the perfect action of that region, and thus aberrations of speech would be produced. But the same artery also supplies blood to the corpus striatum of the same side. Hence, the frequency with which aphasia is associated with right hemiplegia. The cause of the obstruction is generally, according to Dr. Jackson, embolism; for in twenty of his cases the heart was more or less affected, and in thirteen of them there was valvular disease."

Other British writers on the subject are Sanders, Moxon, Ogle, Bateman, and Bastian. The Germans seem to have paid little attention to the matter since 1861, though before that time they had published excellent memoirs, preëminent among which must be mentioned that of Bergman, in 1849. In our own country we have already seen that the subject early attracted attention. More recently Prof. Austin Flint (*Medical Record*, vol. i., p. 4, March 1, 1866) has reported six cases,

attended with hemiplegia, in one of which the autopsy showed extensive softening of the left anterior lobe; and in four, in which the situation of the hemiplegia was noted, this was upon the right side. Dr. H. B. Wilbur has a memoir upon aphasia in idiots, in the *American Journal of Insanity*, July, 1867. Dr. E. C. Seguin has an important memoir—giving a history of the subject, reports of forty-eight cases from records of the New York Hospital, and valuable statistical tables—in the Journal of Psychological Medicine, January, 1868. Dr. Roberts Bartholow reviews the subject, and reports three cases in the same Journal for April, 1868. Dr. T. W. Fisher has a very philosophical paper, and a report of thirty-eight *post-mortem* examinations, in the *Boston Medical and Surgical Journal*, September 1, 1870, *et seq.*

"With this outline-statement of the history of the subject of aphasia, we are in a position to inquire more fully into the evidence which locates the organ of language in a particular region of the brain. A clear idea of the anatomy of the parts fixed upon latterly as the seat of the faculty will aid in the understanding of the subject." The following account is condensed by Trousseau (*op. cit.*, p. 245) from Broca's description in his essay, *Sur le Siége de la Faculté du Langage Articulé:*

The sulcus of Rolando separates the frontal from the parietal lobe, running obliquely from above, downward, along the outer surface of the hemisphere, and beginning at the median fissure between the two hemispheres, and ending in the Sylvian fissure. It is limited, anteriorly, by the transverse frontal convolution, posteriorly by the transverse parietal convolution. The anterior or frontal lobe comprises, therefore, laterally, all that portion of the hemisphere which is situated in front of the sulcus of Rolando, and inferiorly all that portion which is in front of the Sylvian fissure. The lower portion of the frontal lobe consists of the orbital convolutions, while its upper and lateral portions are constituted by the frontal convolutions, properly so called. These are three in number: an upper or first frontal convolution, a middle or second convolution, and a lower or third frontal convolution. They are all directed from before, backward, and terminate, after a more or less tortuous course, in the transverse frontal convolution, of which they seem to be the ramifications. The third frontal convolution is free in its upper half, and separated from the temporo-sphenoidal lobe by the Sylvian fissure, of which it forms the upper margin. It is on account of this relation that the third frontal convolution is sometimes termed the *upper* marginal convolution, while the name *lower* mar-

ginal convolution is restricted to the first temporo-sphenoidal convolution. When the two marginal convolutions, the upper and lower, are drawn away from the Sylvian fissure, there is seen a large and slightly-prominent eminence, from the summit of which proceed five small simple convolutions, or rather five rectilinear folds, radiating in a fan-like manner. This eminence is the *lobule of the insula*, which covers the extra-ventricular nucleus of the corpus striatum, and which, rising from the bottom of the Sylvian fissure, is structurally continuous by its cortical layer with the deepest portion of the two marginal convolutions. The result of these structural relations is, that a lesion which extends by continuity from the frontal to the temporo-sphenoidal lobe, or the reverse, must necessarily pass through the lobule of the insula, and then affect the extra-ventricular nucleus of the corpus striatum.

"The lobe of the insula, or island of Reil, is found in no other mammal than man and the monkey. In the latter, however, it is very slightly developed, and has no trace of convolutions. In aberrations of speech this part is very often involved in the lesion."

Now, although several cases on record appear to show that lesion of the third left frontal convolution is sufficient to produce derangement of the faculty of speech, yet the weight of evidence is decidedly against limiting the seat of the organ to this part. Thus, of five hundred and fifty-six cases of aphasia tabulated by Seguin, this convolution was damaged in but nineteen. Moreover, of fifty-two autopsies, made with special reference to this point, only eighteen favored Broca's doctrine, while thirty-four opposed it. Other cases might be cited, but these are sufficient to decide the question against the doctrine. Indeed, a single instance of aphasia occurring without lesion of the third frontal convolution would, of course, invalidate the claim that this part is the exclusive seat of the organ of language.

The theory of Marc Dax, as we have seen, locates the faculty of speech in the left hemisphere; it is based upon the association of aphasia almost, if not quite, invariably with right hemiplegia, when there is any paralysis at all. That this is the fact in the vast majority of cases there can be no question. In one of Dr. Seguin's tables we find two hundred and forty-three cases of aphasia associated with right hemiplegia, against seventeen cases of the affection with left hemiplegia. Another table, of autopsies in five hundred and forty-five cases of

aphasia, shows the left anterior lobe to have been the seat of the lesion in five hundred and fourteen, against thirty-one cases where the lesion was located elsewhere. Of eighty-two additional cases from other sources, the left hemisphere was shown, either by *post mortem* or by the hemiplegia, to have been the one affected in eighty, the right in two.

How shall we explain this immense preponderance of disease of the left hemisphere, and especially of its anterior lobe, as a concomitant of aphasia? We cannot admit that the organ of language is situated in the left anterior lobe, or even in the left hemisphere, to the exclusion of the other; for the fact remains that lesion of the right hemisphere is sometimes followed by aberrations of speech, the left being perfectly healthy. One such case—and there are several on record in which the autopsy confirmed the deductions drawn from the symptoms—is sufficient to overturn the theory which restricts the situation to one side of the brain; and one such as that reported by Dr. Simpson (*Medical Times and Gazette*, December 21, 1867), in which there was extensive lesion of the third left frontal convolution in its posterior part, and no epilepsy, paralysis, or aberration of speech, is of course utterly destructive of Broca's views.

"The fact that aphasia is more frequently conjoined with right hemiplegia is undoubtedly due mainly to the fact . . . that the left middle cerebral artery is much more liable to be plugged by an embolus than the right; and it is by embolism that aphasia is generally caused. Dr. Hughlings Jackson (*loc. cit.*) has very satisfactorily worked out the relation, and my own experience abundantly confirms the fact. At the same time it appears to be clearly shown that the left anterior lobe, or rather, in accordance with Dr. Jackson's views, those parts of the brain nourished by the left middle cerebral artery, are more intimately connected with the faculty of articulate language than any other region of the encephalic mass. It is probably true, as originally advanced by Dr. Moxon (*British and Foreign Medico-Chirurgical Review*, April, 1866, p. 481), and since urged by Dr. William Ogle ("St. George's Hospital Reports," vol. ii., p. 83), that the organ of speech is to be found in both hemispheres, and that one side is more generally em-

ployed than the other, just as we ordinarily give a preference to one eye, or one ear, or one hand; and that this side is the left. Gratiolet's facts, adopted by Broca to support his view of exclusiveness, will certainly lend force to the argument in favor of preference. This careful anatomist found that the left hemisphere is developed before the right, and that it is better nourished. Both of these circumstances are owing to the greater supply of blood which it receives.

"Undoubtedly, many of the cases which have been brought forward as militating against the doctrine of localization of the organ of speech are not cases of aphasia at all, but simply instances of inability to speak from paralysis of the muscles concerned in speech. Again, in very many instances the *post-mortem* examination has not been properly made, and lesions, involving one or the other anterior lobe, have been overlooked. It is now a well-recognized fact that the cerebral tissue may be materially diseased, and the lesion not be detected without microscopical examination.

"Giving a very full consideration, therefore, to the facts and arguments which have been urged on all sides of the question, I am constrained, while rejecting the restricted location of MM. Dax, and the still more limited situation contended for by Broca, to believe:

"1. That the organ of language is situated in both hemispheres, and in that part which is nourished by the middle cerebral artery.

"2. That, while the more frequent occurrence of right hemiplegia, in connection with aphasia, is, in great part, the result of the anatomical arrangement of the arteries, which favors embolism on that side, there is strong evidence to show that the left side of the brain is more intimately connected with the faculty of speech than the right."

Dr. Hammond now gave the histories of fourteen cases of aphasia, which had come under his own observation. We give some of them, mostly in bare outline, referring the reader for the details, as well as for a more complete statement of the speaker's views, to his forthcoming work on "Diseases of the Nervous System."

Case I. was one of amnesic aphasia, without paralysis or

incoördination, from a blow on the left temple. The autopsy showed an ecchymosed spot, the size of a half-dollar, involving the left anterior lobe at its lateral and posterior margin. Death was due to subsequent meningeal hæmorrhage.

Case II.—A sea-captain, while giving an order, suddenly fell unconscious on the deck. He soon regained his senses, to find that he had lost power over the right half of his body, and also the ability to speak. His aphasia was both amnesic and ataxic; and he could no more write than speak. He had rheumatic heart-disease.

Some three months afterward he had nearly recovered from the hemiplegia, and had regained his speech, when he had a second attack, this time without paralysis of motion, but with loss of sensibility on the right side. "The memory for words was entirely destroyed; though he could pronounce distinctly any word he was told to say, if he did not allow too long a period to elapse between the direction and the response.

"About four months after his last seizure he consulted me. At this time he could say a few words, and he employed them to express all his ideas, assisting himself with very energetic gestures, which, however, were rarely expressive of his thoughts. The words he thus constantly used were *sifi*, which signified both yes and no; and *time of day*, which he employed when he had any other answer than simple affirmative or negative to give. Besides these expressions he had an oath, *Hell to pay!* which he ejaculated whenever he did not succeed in making himself understood, and sometimes without any such exciting cause. These were the only expressions he could originate, but he could pronounce distinctly any word he was told to say, and even as many as three short successive words. When told to write, he took the pen, and, on my telling him to give me his name and address, wrote 'Time of day,' and then, seeing that that was not the correct answer, immediately followed it with 'Hell to pay!' On my remarking to him that he had given me wrong information, he immediately wrote 'sifi.' Any word, however, which I told him to write, he did without any difficulty, and thus I obtained several long sentences from him.

"The main point of interest about this case . . . . is the

occurrence of ataxic aphasia with hemiplegia, as concomitants of the first attack, while the second was characterized by purely amnesic aphasia and no paralysis."

Case III. was one of amnesic aphasia with paralysis, from a blow on the left temple. Diagnosis of fracture of the internal table was made ; trephining was practised a few days afterward ; a splinter, found pressing on the posterior frontal convolution, was removed ; and the aphasia was at once and perfectly cured.

Case IV. exhibited both the amnesic and the ataxic form of aphasia, and was accompanied by right hemiplegia. These affections, which came on gradually, were probably caused by softening from thrombosis of the left middle cerebral artery.

Case V. was one of purely ataxic aphasia, attended by profound right hemiplegia, and was attributed, like the last, to thrombosis of the left Sylvian artery.

Case VI. had a history of five attacks of right hemiplegia, doubtless from embolism, with partial amnesic aphasia, and also with ataxic aphasia, which disappeared with the hemiplegia.

Case VII. showed both amnesic and ataxic aphasia, with right hemiplegia. Diagnosis, embolism of left Sylvian artery. (This case, which is one of much interest, will be reported in full in the Psychological Journal for April. Cases V. and VI. may be found in the number for January, 1871, pp. 2, 10.)

Case XI. was one of ataxic aphasia, with right hemiplegia. Diagnosis, hæmorrhage, involving the left corpus striatum.

Case XIII.—Vertigo, right hemiplegia, and slight difficulty of speech, both amnesic and ataxic. Some months later, an attack of left hemiplegia, with no difficulty of speech. A third attack is characterized by right hemiplegia and aphasia ; a fourth and a fifth by delirium and hemiplegia—that of the left side unattended by aberrations of language, that of the right accompanied by ataxic and amnesic aphasia.

"He forgot the names of the most ordinary things, and there were many words that he could not articulate at all. Thus, when he wanted a fan, he called it 'a large flat thing to make a wind with.' He forgot my name, and could not pronounce the words *beetle*, *general*, *physician*, and many others.

I sent him to Newport, greatly improved; but he had other attacks while there, and finally died in the autumn of the present year, of, I presume, cerebral softening.

"The interesting features of this case are the concurrence of hemiplegia and ataxic and amnesic aphasia, and the striking fact that there was no aphasia when the paralysis involved the left side. Thus, according to my views of the case, the patient had repeated attacks of cerebral embolism. When the embolus lodged in the left middle cerebral artery, there was aphasia accompanied by right hemiplegia; when the embolus obstructed the right middle cerebral artery, there was left hemiplegia but no aphasia."

Case XIV. is similar to the last. The patient, with a history of rheumatism and a bellows-murmur, had eleven attacks of vertigo, unconsciousness, and hemiplegia. When the last was on the left side, there was no aphasia; when on the right, there was well-marked difficulty of speech, both amnesic and ataxic. (This case also will appear in the clinical lecture on Aphasia in the April Psychological Journal.)

A case resembling the last two is reported by Stewart, in the *Medical Times and Gazette*, July 9, 1864.

"The views which the cases I have observed have led me to form, have been confirmed by my recent study of the subject of aphasia. These have already been given in part, but the detail of the foregoing histories enables me to express the remainder with more confidence.

"It cannot have failed to strike the hearer that, in all the cases of which hemiplegia formed a feature, the aphasia was of the ataxic form, while, when there was no hemiplegia, the aphasia was amnesic. In the one the individual was deprived of speech, because he could not coördinate the muscles used in articulation; in the other, because he had lost the memory of words. This is a point which has not hitherto been noted. The phenomena indicate, I think, very clearly the seat of the lesion and the physiology of the parts involved.

"The gray matter of the lobes presides over the *idea* of language, and hence over the memory of words. When it only is involved, there is no hemiplegia, and there is no difficulty of articulation. The trouble is altogether as regards the memory of words.

"The corpus striatum contains the fibres which come from the anterior column of the spinal cord, and is besides connected with the hemisphere. A lesion, therefore, of this ganglion, or other part of the motor tract, causes paralysis of motion on the opposite side of the body. The cases I have detailed show, without exception, that the [loss of] power of coördinating the muscles of speech is directly associated with this hemiplegia. A lesion, therefore, followed by hemiplegia and ataxic aphasia, indicates the motor tract as the seat. If amnesic aphasia is also present, the hemisphere is likewise involved. The analysis of the cases reported by Ogle, Jackson, and some other observers, shows that the association existed in their cases, although they have not noticed it as of any physiological or pathological bearing.

"Another important feature of the foregoing cases is the constant association of the aphasia with right hemiplegia when there was any paralysis at all. This indicates, perhaps, only the more frequent occurrence of embolism on the left side; but the last two cases, as well as the one quoted from Dr. Stewart, show that the left hemisphere is more intimately connected with the faculty of speech than the right. In fact, it appears to me impossible to avoid this conclusion.

"So much for some of the various theories which exist relative to the localization of the organ of language, and for the clinical history of aphasia. I have not thought it necessary to discuss the view of Schroeder van der Kolk, that the faculty of articulate speech resides in the corpora olivaria, because there is little, if any, physiological or pathological evidence to sustain it, nor the hypothesis of Brown-Séquard, that speech is a reflex phenomenon, because there is no evidence in support of that opinion. Neither have I, though much tempted, ventured into the philosophy of the subject to any considerable extent.

"As to the causes, the prognosis, the diagnosis, morbid anatomy, and pathology, they have been sufficiently considered in the remarks made; and the treatment is, of course, that of the pathological condition to which it is due, whether this be cerebral hæmorrhage, embolism, thrombosis, softening, hysteria, wounds, the bites of poisonous serpents, or other cause.

One point, however, should be mentioned in this connection, and that is, that constant efforts should be made to exercise the vocal organs, by attempts to speak, and by the application of the galvanic or of the faradaic current to the tongue and other muscles concerned in articulation."

Dr. J. C. Dalton: I have listened to the paper with unusual interest. It takes up a topic which has excited much discussion at the hands of able writers on both sides; the theory it propounds having been debated with varying fortunes for something like thirty or forty years. It is very certain that, if we could succeed in locating in any particular part of the brain so very important and peculiar a function of mental power as that of speech, it would not only be of great moment in itself, but it would have a strong bearing upon the old doctrine of Gall and Spurzheim concerning the location of all the mental faculties in special parts of the brain. This gives the subject additional interest.

The paper has traced very satisfactorily and completely the history of the various attempts to locate the faculty of speech —first in the anterior lobes of the brain; then in the left anterior lobe; then in the third convolution of this lobe; and, finally, in the whole region supplied by the middle cerebral artery. It has brought out very clearly the distinction, of cardinal importance, between ataxic aphasia, dependent on inability to coördinate the muscles of articulation, and amnesic or true aphasia, dependent on the loss of the mental power to remember words, or to represent ideas by them. A point new to me, and of the greatest interest, is the ingenious explanation given of the habitual occurrence of aphasia as a result of lesions of the left hemisphere, taken in connection with its occasional occurrence from lesions of the right—the theory that this is analogous to right- and left-handedness, and due, not to original difference in function of the two hemispheres, but to their independent action, and to the earlier or stronger development of the left, so that it comes to be used in preference to the right, and acquires its predominant functional power by this kind of education.

There is a consideration which strikes me as important in judging of the value of the very numerous cases adduced in

support of the localization of the faculty of language; that is, to determine exactly what the faculty of language is. Is there any distinct mental endowment which we can designate as this faculty; that is, as the faculty of articulate speech? For there are, as it seems to me, two essentially different kinds of language—one possessed by animals, and sometimes even in greater perfection than by us; the other peculiar to man. There is a language altogether emotional—springing from the emotions and appealing to them—which conveys very definite information within its own sphere; this is the language of expression. When we observe the vocal sounds of a dog or cat, for example, and the postures and movements that accompany them, we know perfectly well whether the animal is pleased or angry, frightened or feeling at ease. Perhaps all the emotions may be thus expressed, without articulate language, simply by the tones of the voice, and the manner in which they are emitted. This language we of course possess in common with animals, though not to the same extent as they.

But when we come to articulate speech, that is a very different thing. The word which we employ to represent an idea is an entirely arbitrary symbol; it has nothing of the character of the object for which it stands. Articulate language, then, is a series of sounds arbitrarily determined on to represent our ideas. In order to use it, or to comprehend it, it is necessary that the memory should be very highly developed; and I am not sure but that may be all that is necessary, but the "faculty of language" may be simply a very highly-developed function of memory. We know that deficiency of memory always produces difficulty in the use of language; and the cases of most interest to us, in this point of view, are those of pure amnesic aphasia, where there is no paralysis of voice or of articulation, but simply loss of memory of words. I think every one has felt more or less of a transient deficiency in the power of language from a momentary failure of memory. It requires no apoplexy or embolism to make us conscious that at some times we cannot command words as well as at others. The words we are most apt to forget are those expressing a rather complicated idea. We never have any difficulty in recollecting words expressing ideas simple and

familiar, as *dog*, *cat*, *to-morrow*, *yesterday ;* but those required to express the exact shade of meaning of ideas perhaps complicated, perhaps unfamiliar, as *reputed*, *transubstantiate*, *rehabilitate*—those are the words which now and then elude us. We lose, too, the names of unfamiliar persons or things. I suppose every one has gone up to a door, rung the bell, and then been covered with confusion at his inability to remember the name of the person he was to see; or has been telling a story, and suddenly forgotten the very word that was to give it point. I was once relating a humorous incident, the whole gist of which depended upon the contents of a bottle which a gentleman had been handling in careless fashion, and upon his terror on being told what he was doing. I knew, as soon as I had begun the narrative, that I had forgotten the name of the liquid in the bottle, and that, if I did not recall it in time, my story would fall perfectly flat. I had in mind, all the while, the appearance and character of the liquid—an oily compound, highly explosive, and by no means to be knocked about in the rough manner I was describing—but it was only at the very instant it was wanted that the name, *nitro-glycerine*, came to me. We see, then, that words are forgotten by men in perfect health. I do not think we can draw any sharp line of distinction between the failure of language in these cases and that observed in the morbid condition known as complete aphasia. When the aphasia is complete, I suspect it is nothing but simple loss of memory.

Now, can we locate this faculty of memory, if you choose to call it such? Can we place it in the anterior lobe, or in those parts of the brain in the neighborhood of the fissure of Sylvius? We have noticed, in reviewing all the cases reported, that at first there were quite a number showing the occurrence of aphasia, with injury of the anterior lobes; after a time there were others showing injury of these lobes, and even entire destruction of them, without aphasia, and consequently the theory which located the faculty of language here had to be given up. Then, from certain cases exhibiting aphasia with lesion only of the third left frontal convolution, the faculty was located in this more limited spot; but since that time there have been many cases in which this convolution has been nearly or

quite destroyed, and yet no aphasia has existed. I fully agree with Dr. Hammond, that these negative cases are entirely sufficient to overturn the theory that the power of language exists exclusively in this part of the brain. But may it not be questioned whether it exists exclusively in *any* part of the brain? There is no distinct line of demarcation between any two parts of the hemispheres. We find the two opposite sides fully connected by the transverse commissure, and fibres from all parts of the anterior, middle, and posterior lobes, converge to form the cerebral peduncle. If we were to depend alone upon the anatomy of the fibres of the brain, I do not think we could form any *a priori* notion of the possibility of locating any faculty in any one part. I think it possible that the brain must act always as a whole, and that, if the power of language depends simply upon a highly-developed faculty of memory, we may regard the memory as located in the whole brain, right and left side alike, both acting together. How, then, have we loss of memory when a limited part alone is injured? I think that is explained by the diminution of the functional power in an organ which acts as a whole by injury of any part of it. Perhaps, if we had as many cases of embolism of the posterior lobes as of the anterior, we should have aphasia as often resulting from lesion of those lobes.

Perhaps the most curious fact of all is the occurrence of aphasia, in such a vast preponderance of cases, in connection with hemiplegia of the right side. I think the explanation we have heard to-night is the first which has been offered at all satisfactory—Moxon's theory of the habitual left-handedness, so to speak, of the brain. Until this was suggested, there seemed to be a good deal of force in the argument of Broca's opponents, that he gave different functional endowments to corresponding parts of an organ so symmetrical as the brain. But the new suggestion meets this very happily. There would seem to be a certain analogy between the habitual use of the left brain and that of the right hand, yet it may not be so close as it at first appears. There is a mechanical necessity for using one hand or foot rather than both in many cases, and, if the right happens to be originally a little the stronger, it gets the preference, and holds it by virtue of education and habit. I

think it doubtful, however, whether we can extend this analogy much further. I do not know of any reliable facts to show that we use one eye or one ear rather than the other; and certainly there is no evidence that one lung or one kidney, or other symmetrical viscus, has any precedence over its fellow, as there is no apparent necessity for it. It is questionable, therefore, whether we can credit the left half of the brain with greater functional activity than the right. But if we admit it—and Dr. Hammond has mentioned that the left side is the earlier developed and the better nourished—may not this superior activity and efficiency afford the explanation of the fact that aphasia occurs oftenest with lesion of this side? If the left hemisphere is the stronger and the more used, it is this which will assist us most in the use of language, as in other mental processes; consequently lesion of this hemisphere will be the most likely to produce aphasia in all its varieties, from the simple forgetfulness of particular words to the complete form where all power of articulate expression is lost. I think it is possible to explain all the facts in this way.

Although, then, many instances appear to point to the location of the faculty of speech in some part of the brain situated near the fissure of Sylvius, I doubt very much whether we can place it exclusively even in so broadly-defined a region as this; and I am in still greater doubt whether we can locate this faculty, or any faculty, upon one side of the brain alone.

Dr. Neftel: I was glad to hear mentioned the name of Dax, who I think must be regarded as the real discoverer of the centre of speech, though commonly ignored by writers on aphasia. This centre is certainly the most interesting of all those which have been discovered in the nervous system, inasmuch as it is the only one belonging to the intellectual sphere which has as yet been localized in the brain. But the question arises whether we are justified in admitting the existence of such a centre. I think we are justified by analogy. Recent investigations have discovered several other centres, some of which produce complicated coördinate movements with the regularity of clockwork. These centres are innervated either directly by the physical organ or through reflex action from the periphery. Such a centre is, for instance, the well-known

centre of respiration, situated in the medulla oblongata, at the origin of the pneumogastric and accessory nerves. Its irritation increases the respiratory movements (dyspnœa); its section abolishes them, and is therefore fatal. Another centre has lately been discovered in the medulla oblongata—the vaso-motor centre. Its irritation produces contraction of the arteries and increased blood-pressure in the heart; its section, on the contrary, paralyzes the vaso-motor nerves; the arteries become dilated and filled with blood, and the heart almost empty. The centre of deglutition and mastication is also in the medulla oblongata. Nothnagel has discovered the so-called convulsive centre, situated in a limited space on the floor of the fourth ventricle, in the pons Varolii. Its direct or reflex irritation produces general epileptic convulsions. Goltz has discovered the centre of equilibrium, situated in the corpora quadrigemina. Setschenow, a countryman of mine, has discovered an inhibitory centre for the reflex activity of the spinal cord situated in the thalami optici; and Adamück, another countryman of mine, has quite recently discovered the centre for the coördinate movements of the eyes, situated in the anterior hills of the corpora quadrigemina. But the centre of speech is certainly the most interesting of all, being at the threshold between the motor and the intellectual functions.

The affection of this centre—aphasia—is generally produced by embolism of the left arteria fossæ Sylvii, which is often the seat of embolism, while the right one is very seldom. The most plausible explanation of this fact is that the left carotid artery originates from the aorta, and that therefore the current of blood in the left cerebral arteries is more powerful than in the right ones. This explains also the greater weight of the left cerebral hemisphere, and the greater development of the right side of the body. Griesinger and Sander think that the centre of speech is situated in the "island of Reil;" and, as an anterior branch of the arteria fossæ Sylvii goes to the third frontal convolution, the affection of this convolution generally accompanies embolism of the arteria fossæ Sylvii.

I have seen quite a number of aphasics, both in Europe and in this country, but I shall mention only two cases which I have recently had under observation, and which I think are

in some respects unique. One was the wife of a physician, who had had intermittent fever for many years. Last year she had a febrile disease, accompanied with severe headache, and was suddenly attacked by apoplexy, with loss of consciousness, passing into coma. These symptoms disappeared after a few days, but there remained aphasia with right hemiplegia. Her husband described the symptoms, and I gave my opinion that the acute disease which preceded the apoplectic attack must have been endocarditis, followed by embolism of the left arteria fossæ Sylvii. But, on careful examination, I could not find any trace of endocarditis, and I concluded that probably the embolism was effected by pigmentary matter, which is often found in considerable quantities (melanæmia) in cases of severe and protracted intermittent fever. I treated the patient with the galvanic current during several months, and she finally recovered.

Another patient, a young lady, presented a peculiar kind of aphasia, which originated quite suddenly. She called every thing by the wrong name, and was surprised that others did not understand her. There was no paralysis in this case, but a considerable degree of leucæmia. As far as I could ascertain, there was one white blood-corpuscle for fifty red ones, the normal proportion being as one to three hundred. I suppose that here a transitory embolism of the left arteria fossæ Sylvii was effected by the agglomerated white blood-corpuscles, for she entirely recovered under tonic treatment.

The circumstance, so characteristic of aphasia, that patients, as a rule, will show an object if its name is given, but are unable to name an object shown to them, Griesinger expresses in the following manner: "The conduction from the acoustic image (Klangbild) of an object to its optic image is not affected in aphasia, while the conduction from the optic image to the acoustic image is interrupted."

MECHANICAL TREATMENT OF HERNIA.

Dr. Norton Folsom exhibited a truss of his own invention, and read a paper upon this subject, of which the following is an abstract:

The mechanical treatment of hernia has of late fallen into

the hands of mechanicians, who lack the knowledge of anatomy, physiology, and pathology, requisite for the scientific treatment of a lesion so liable to grave complications and consequences. Nothing short of a regular medical education is sufficient. The community has suffered by the abandonment of this field by the surgeon, as many of the truss-venders simply endeavor to sell expensive instruments without reference to their suitableness. It is the duty of the practitioner to insure that his patient uses efficient apparatus, and above all that it does not aggravate what it is intended to cure.

Hernia is recognized as a very common disease; but, besides those aware of their infirmity, there are many in whom it is incipient and fails to attract attention; yet it is in these very cases that its efficient mechanical treatment is especially important, as its progress may be arrested by easy and convenient apparatus, and much danger and disability be avoided. Patients may disregard this ailment, if it gives little inconvenience, or even conceal it from their medical advisers, from ignorance or false shame.

Inguinal hernia, which is acquired, not congenital, exists for a considerable time, in most cases, as bubonocele. The surgeon is aware, however, of the essentially progressive character of the disease, and that there is no limit to its extension. The stomach itself has been known to descend to the scrotum, and a hernia has been observed of such size and character as to prevent sexual intercourse. Of course, the most serious feature is the liability to strangulation. As the surgeon, and not the patient, is familiar with these and other dangers, and with the possibility of arresting and even curing the affection, it is the duty of the obstetrician, of the family physician, and of every custodian of the health and bodily integrity of others, to ascertain whether those under his care are subject *in any degree* to this ailment, and see that they are properly informed regarding it. While its tendency is to increase if neglected, the reverse is true if protrusion be entirely prevented for a sufficient time. This is especially true of "hernia with congenital sac," where the protrusion is into the vaginal process of the peritonæum, which has failed to close as it should before birth.

There is a strong natural tendency to recovery in these

cases, and this is the reason that the great majority of infants can be permanently cured, while it is the exception in adults, in whom the hernia is usually "with acquired sac." But even in adults the parts have a tendency to resume their resistant power, so that, after the protrusion has been prevented for some time, gentle means may suffice for maintaining the parts in place.

The most successful instrument and method for radical cure, in either variety of hernia, is simply that which most efficiently keeps the viscera at all times within the abdomen, though a special pressure over portions of the inguinal canal, for limited periods, and with due precautions, will be of service in certain cases.

The injury most frequently done by injudicious treatment is the weakening of the parts by the pressure of a highly-elastic spring on a convex pad, which bores its way into the body, driving the pillars of the ring farther and farther apart, stretching the inter-columnar fibres, and causing wasting of the tissues—the same process being continued from the outside that was going on before from within by the action of the disease. The use of a convex pad should be abandoned whenever the hernia can be perfectly retained by a flat surface. In obese persons more or less convexity is usually necessary, but the cushion of fat prevents the boring action to a great extent.

It is desirable that the spring of a truss should conform accurately to the shape of the body, so as not to be displaced by the movements of the patient, the danger of a misplaced pad being not only the partial or complete escape of the hernia, but also the various evils resulting from compression of the spermatic cord against the pubes.

The form of truss exhibited, made by Tiemann & Co., is a simple one. In order to secure the most accurate adjustment, each one has been made from measurement, and fitted to the individual before being tempered and finished. It consists of an oval back-plate, of steel or other metal, about $\frac{1}{16}$ inch thick, 5 inches long, and $2\frac{1}{2}$ inches wide, intended to rest upon the flat surface at the upper part of the sacrum. The edges are slightly everted all around, to prevent cutting into the

skin. In the middle of this is riveted a piece of metal $1\frac{1}{8}$ inch square, portions of which are turned up to form hinges with the arms of the truss. The arms are made of steel, about $\frac{1}{16}$ inch thick, and $\frac{7}{16}$ inch wide, with rounded edges. Each of these curves vertically from the hinge about 2 inches upward, the highest point being about midway in its course; and from this point curves downward 4 or 5 inches to the tip in front. This curve is to bring the arm along just below the crest of the ilium, to avoid the disturbing action of the glutei muscles, and carries it between the anterior superior and the anterior inferior spinous processes of the ilium. This curve is given in cutting the arm out from the sheet of metal. The lateral curve is given by the hand of the surgeon, before tempering. The truss is always made double, whether rupture exists on both sides or not. The pads are made of wood, somewhat pear-shaped, about $3\frac{1}{2}$ inches long, 2 inches wide, and $\frac{1}{2}$ an inch thick, perfectly flat, with rounded edge. The lower edge is straight, and rests against Poupart's ligament. This is the form recommended for bubonocele, and in fact for every inguinal hernia which is perfectly retained by it. The pad is fastened to the arm by two screws, adjustable by slots if desirable. The upper one in each pad is a stud-screw, and these two are connected by a leather strap 7 or 8 inches long. About six inches from the tip of each arm may be placed a small stud for another horizontal strap, to give additional abdominal support. The pressure of this truss is intended to strike a medium between the very elastic French model and the much stiffer German instrument. The exact lateral curve being determined, the metal is tempered, and plated with nickel or silver, to prevent rusting. No cover is used upon it; a silk handkerchief or flannel bandage being worn under it, and a compress or a flat sponge softened by glycerine being applied beneath the pad if required. In very thin persons some change of shape of the back-plate may be necessary to avoid pressure on the spinous processes. A pad of any shape or kind can, of course, be applied to this frame.

The principal merits claimed are as follows: 1. Firmness and immobility. 2. No thigh or perineal strap is necessary in most cases. 3. The straps in front support the abdomen,

which is found practically to be an advantage. 4. It is more comfortable for being double, and not only is the hernia better retained in this way, but protrusion on the other side, to which there is so often a tendency, is guarded against. 5. Its durability is very great, which makes it economical. 6. It contrasts with the terrible offensiveness of an old padded truss, covered with material that absorbs the secretions, in being perfectly cleanly, as it can be washed, and the simple straps can be renewed whenever desired. 7. While it gives as good a chance for radical cure as any other, it is believed not to have the tendency to aggravate the disorder, that makes many of the instruments in use sources of actual danger.

The paper of Dr. Folsom was accepted, and laid on the table for future discussion.

The Society adjourned.

Stated Meeting, February 13, 1871.

DR. ABRAM JACOBI, President, in the chair.

THE PRESIDENT announced the admission to membership of Drs. Eugene Peugnet, William R. Fisher, Frederic E. Schwedler, George B. Pomeroy, Stephen M. Roberts, Daniel D. W. Harrington, J. Theus. Taylor, Rudolf Tanszky, and Mary E. Greene.

The report of the Committee on Intelligence was read by Dr. Castle, and that of the Committee on Meteorology by Dr. Goodwillie.

DECEASED MEMBERS—DR. BENJAMIN DRAKE.

Dr. VAN KLEEK remarked that, since the Society had last met, death had been busy in its ranks. In one short month no less than four of its members, including two former Presidents, and its trusted and highly-valued Treasurer, had been called from their labors to their reward. Of one of them, whom he had intimately known, he had, at the request of the Secretary, prepared a brief sketch:

Dr. Benjamin Drake, a former President of the Society,

died at his residence in this city, January 11, 1871. He was the third son of John Drake, a successful merchant, and was born in New York, February 14, 1805. He early manifested decided literary and scientific tastes, and his condition in life was happily such as to enable him to cultivate and gratify them. He graduated with honor in arts at Columbia College in 1825, and in medicine at the College of Physicians and Surgeons three years later. After two years of hospital study in Europe, he began practise in Chambers Street, removing subsequently to the Bowery and to East Broadway. He remained unmarried, but none the less exercised a liberal hospitality.

Joining this Society in 1832, he was its President in 1848 and 1849. In 1853 he was elected Permanent Member of the State Society. He took a prominent part in organizing the Academy of Medicine, and in this, as in the County Society, he was an active member. He was for several years an Attending Surgeon at the New York Ophthalmic Hospital (now discontinued), and afterward gave much attention to the Eastern Dispensary, especially its vaccine department. At one time he entered ardently into political life, though never seeking political preferment, and was a devoted champion of Henry Clay.

Dr. Drake's attainments were those of a man of wide and varied culture; indeed, the speaker had rarely known a man who knew so much of almost every thing; and, in the circle in which they both moved thirty years ago, he was esteemed the Admirable Crichton of his day. Skilled in botany, he gave much time to the cultivation of flowers, of which he was an enthusiastic lover. To natural history and comparative anatomy and pathology he gave much study, making free use of the facilities and the material afforded by the menagerie near his residence. He was said to have at one time the most extensive collection of skulls, human and others, in the country.

The doctor was a man of medium height, but of commanding presence. In conversation or debate he had a ready command of language, remarkable rather for its force and compactness than for its ornateness. Toward the close of his life,

failing health and frequent disappointments, acting on a temperament extremely nervous, had rendered him somewhat reserved in general society, and some thought had made him misanthropic. But those who knew him knew that he had a warm heart, and loved to do good to all who came within the circle of its affections.

It was voted that Dr. Van Kleek's biographical sketch of Dr. Drake be placed on file in the archives of the Society; and, on motion, Dr. Van Kleek was appointed by the Chair a committee to prepare suitable resolutions upon the subject.

DR. WILLIAM B. BIBBINS.

The Secretary announced the death of the Treasurer, Dr. William B. Bibbins, and read the proceedings of the joint and special meeting of this Society and the New York Academy of Medicine, touching the matter, which appeared in our last number (p. 231).

Dr. Ellsworth Eliot moved that the minutes just read be accepted, and that the resolutions comprised in them be adopted as the sense of the Society. He added:

Perhaps it is right that I should say a few words with reference to the memory of our deceased friend. I think his name stands, in the record of our organization, immediately before my own. He was very early called to positions of honor and reponsibility in this Society, and with what fidelity and efficiency he has always discharged the duties that continued to be thrust upon him, we are all too familiar for me to dwell upon them.

Few members of the profession had so thoroughly prepared themselves for all its duties as Dr. Bibbins. After a course at Yale College, he attended medical lectures in this very building, receiving the diploma of the College of Physicians and Surgeons. He then devoted several years to hospital service, as *interne* at the Bellevue Hospital and of the Nursery Hospital on Randall's Island. After this he was for more than ten years one of the visiting physicians to the Demilt Dispensary. The knowledge and skill acquired in these various positions were turned to good account in a large practice. And they inured to the benefit of those who are too often

compelled to forego them, for Dr. Bibbins did much service among the poor.

It is a wide place which his death has made vacant. I know of no one dearer to a large number of friends; of no one to whom more persons were under greater obligations for favors conferred; for he was always ready to help, by his advice or by his work, and often at great personal sacrifice. He has died in the heyday of life. But a year ago, Dr. George T. Elliot, Dr. Bibbins, and myself, were together in the Comitia Minora, and their prospect of a ripe old age seemed far better than that of most of us. But they have gone from their spheres of usefulness; the places which have known them shall know them no more; yet, none here can doubt that their memory will remain green, while one of those whose lot they have brightened shall live to cherish it.

The motion of Dr. Eliot was carried.

DR. GEORGE T. ELLIOT.

Dr. Fordyce Barker: In common with all present, I heartily sympathize with the sentiments to which my friend (Dr. Ellsworth Eliot) has just given utterance, in relation to the loss which the medical profession, this Society, and the public, have sustained by the death of Dr. Bibbins.

It also becomes my duty to announce the death of our late President, Dr. George T. Elliot; and it may be permitted to me, who long held most intimate personal, professional, and collegiate relations with him, to add a few commemorative words as a tribute to one whose memory will long be cherished with the warmest affection by those who had the privilege of enjoying his personal friendship, and with high esteem and great respect by all those who love our noble profession, and who honor those honest and zealous workers in it who have contributed something to its improvement in practice and its progress in science. For George T. Elliot was one of this class. Here, where he was so well known, it is unnecessary for me to speak of the zeal and ardor with which he cultivated those talents with which he was originally endowed, not from mere personal ambition and for selfish ends, but from a high sense of moral responsibility and an elevated apprecia-

tion of the dignity and importance of his calling. Here I need not allude to his valuable and interesting contributions to the medical journals of the day, nor to the volume which must ever hold a high place in the estimation of those who are actively engaged in obstetric practice. Nor need I refer to his ability and readiness as a speaker, or the culture and acquirement with which he brought out new suggestions or forgotten associations in the various medical discussions, in this and the other medical societies of which he was an active and a working member:

Nihil tetegit, quod non ornavit.

The zeal and enthusiasm with which he entered upon his duties as President of this Society, the grace, courtesy, and decision with which he presided, the stimulus and efficiency which he gave to the work of the Society, are fresh in the memory of us all. His ability, success, and popularity as a teacher were always subjects of congratulation with his colleagues, and will long remain as a tradition among the students of the college to which he was attached. Here is not the place, and this is not the time, for those who loved him to recall, with tender recollections, his hearty geniality, his bright humor, and sparkling repartee, which never left a sting behind, and the happiness which he enjoyed and diffused in the indulgence of an elegant and refined hospitality. In the active exercise of his profession, which permits no exemption from the calls of duty, even at those hours when the rest of the world are permitted to indulge in the needful repose of body and mind, on an exceedingly hot Sunday in July, while laboriously engaged in the practice of his art, the terrible warning came that his professional mission was ended. Who, in the profession in this city, will ever forget the heart-felt shock with which they received the intelligence that Elliot had been stricken down by apoplexy! To many others, as to myself, must have occurred those strikingly appropriate but somewhat hackneyed lines from Longfellow's "Psalm of Life:"

"Art is long and time is fleeting,
And our hearts, though stout and brave,
Still, like muffled drums are beating
Funeral marches to the grave."

On a Sunday morning, in the depth of winter, his spirit broke from its earthly fetters, leaving to us, by the bright example of his life, the lesson to—

> "So live, that when thy summons comes to join
> The innumerable caravan, which moves
> To that mysterious realm, where each shall take
> His chamber in the silent halls of death,
> Thou go not, like the quarry-slave at night,
> Scourged to his dungeon, but, sustained and soothed
> By an unfaltering trust, approach thy grave
> Like one who wraps the drapery of his couch
> About him, and lies down to pleasant dreams."

On motion, the Chair appointed Drs. Barker, John C. Peters, and Isaac E. Taylor, a committee to prepare appropriate resolutions.

DR. RICHARD T. UNDERHILL.

Dr. Harwood announced the death of Dr. Richard T. Underhill, of Croton Point, a non-resident member of the Society; and the Chair appointed Drs. Harwood, Van Kleek, and Goodwillie, a committee to draw up suitable resolutions, and present them at the next meeting.

PATHOLOGY OF GASTRIC TUBULES.

Dr. Austin Flint read the important paper on "The Pathological Relations of the Gastric and Intestinal Tubules," which we publish in another part of this number.

The President, expressing his high opinion of the value of the paper, which he knew was that of all present, said that he would suggest a point or two to be considered in its discussion. It was a matter of much consequence to find out the causes of the peculiar affection described—the diseases or the conditions which would produce this atrophy of the glands of the stomach and intestine. We know how numerous were the causes of various gastric and intestinal disorders, especially in this country and city; in particular, we knew the great prevalence of gastric catarrh. It would be well worth while to trace the connection between these familiarly-recognized disorders and the one now so clearly portrayed. It was also

indispensable to ascertain whether the *post-mortem* appearances observed in the glands were necessarily the result of vital changes, or might possibly be cadaveric. The former view would certainly seem the more probable.

Dr. Barker heartily concurred in the President's estimate of the paper. Every physician of large experience must find it explaining cases which had baffled his diagnostic skill. The discussion, at least at the present meeting, must probably take the form of clinical reminiscence; and, without a word to add upon the pathology of the affection, or a suggestion to make as to its treatment, he would revert to some cases of his own.

In idiopathic cases—that is, those not occurring as a consequence of any recognized previous disease—which had come under his observation, as well as in those reported in the paper, it would seem that old age was a predisposing cause. They had all reached an advanced period of life. But the same train of symptoms—loss of appetite, aversion to food, progressive debility, and, finally, death from asthenia—had occurred in younger persons, convalescent from disease or after certain physiological conditions.

He remembered that, years ago, when he saw more of typhoid and typhus fever than of late, sometimes a patient would seem to have passed through the disease, and to be well advanced on the high-road of convalescence, when, all at once, without apparent cause, he would show an indisposition to partake of nutriment, and this would steadily increase, with no return of any other phenomena of the fever, until he died of starvation.

So, too, with puerperal fever. He had alluded to this in a discussion on puerperal fever, which had been extensively published, speaking of cases where the fever seemed to have completely disappeared for days, and with it all cause for anxiety; suddenly the stomach gave up; tonics and stimulants failed to produce their wonted effects; and the patients died. He had suggested at that time the very crude explanation that possibly congestion of the gastric mucous membrane prevented absorption of the food ingested.

Even pregnancy and the puerperal state appeared sometimes to lead to this condition. A woman, after a favorable

delivery, had done very well for three or four weeks. Then she had begun gradually to lose appetite; the anorexia and attending debility had rapidly increased; her friends had become alarmed and sent for Dr. Barker, replying to his inquiries, that they could see nothing the matter with her except that she would not eat, and seemed determined to die. He examined the case with the greatest care, interrogating every organ as far as was possible, without finding the slightest sign of organic disease. No treatment availed, and the patient soon succumbed to exhaustion. This very winter he had attended a young lady in her second confinement, who had an attack of remittent fever six weeks before the close of gestation. He watched the case with the greatest anxiety; but the labor was easy and short, the child healthy and vigorous. After delivery she convalesced very rapidly, gaining in strength and flesh, all symptoms of the fever having entirely disappeared. For three or four weeks she went on thus in the most satisfactory manner. All at once she conceived a disgust for food, which could not be overcome, though every article which could be thought of to tempt the appetite was tried. Soon she began to have regurgitation—simple rejection of the food taken, unattended by any nausea. Presently it was with the greatest difficulty that she could be induced to swallow even a teaspoonful of punch, wine-whey, or beef-tea. There seemed to be a physical repugnance which she was powerless to subdue, although she was a woman of strong will, as well as of extraordinary loveliness of character. For some weeks she was kept alive by nutritious enemata, till one morning she died rather suddenly, after a better night than usual.

These cases would suggest that there may be various classes of affections liable to predispose, or to give rise, to the disease in question. Under this category might come the essential fevers; perhaps, also, the many and great changes taking place in pregnancy and the puerperal condition.

The President: I will throw out another hint. I would ask, how is this peculiar change, described as taking place in the small glands of the stomach and intestine, related to the changes which we see, not only in other glands but in the

organs and tissues generally? If we find that it is of the same character as changes found elsewhere, or even similar to them, we shall the sooner arrive at a solution of the question, What is the essential nature of the condition? It strikes me that what we observe in the small glands of the pharynx, for example, or in those of the mesentery, is a pathological change of the same kind seen here. We have either hyperplasia of the connective tissue, with compression of the glandular tissue proper, or granular disintegration of the glandular cells themselves. I should like to ask Dr. Janeway whether the changes described by Dr. Flint are of this kind.

Dr. Janeway said that there was probably a parenchymatous inflammation affecting the mucous membrane, or rather its glands, just as we have, under similar circumstances, a parenchymatous nephritis, attended by swelling of the epithelium, a cloudy state of its substance, and, later, fatty degeneration and atrophy, with an apparent or real increase of connective tissue. The atrophy was probably sometimes due to an increase of the connective tissue compressing the glands, or it might be due simply to a degenerative process.

The President: Is it probable that the same change may take place under different conditions? May it result from anæmia as well as from hyperæmia? When Dr. Barker spoke of the anorexia and inanition as following pregnancy, and apparently resulting from it, it occurred to me that this might be due to the relative anæmia of the stomach and of the digestive organs generally, in consequence of the great demand for blood in other parts. I can imagine that, if anæmia of the glands be kept up for a protracted period, their nutrition may be so far interfered with as to produce atrophy or disintegration of the glandular structure, and this whether the deficiency of their normal blood-supply be due simply to a relative or to a general anæmia.

Dr. Janeway could not answer this question without more careful consideration. Twice within the last two years he had been able to diagnosticate waxy degeneration of the intestines, and in both cases *post-mortem* examination had proved the diagnosis correct.

THE MEETING OF THE STATE MEDICAL SOCIETY.

The President, as one of the delegates to the recent meeting of the State Society, gave a brief report of it. He had never before seen so good an attendance, and was astonished to find a hundred and fifty or two hundred of the same faces in the hall for eight or nine hours every day, enjoying a good joke now and then, but much more enjoying the short papers and their discussion. An offensive feature which he had noticed in the American Association was absent here. At Washington many of the delegates seemed to make it their business rather to run after persons than to attend the meetings. But at Albany republican equality certainly reigned supreme, and unquestionably this powerfully conduced to the good feeling which so markedly prevailed. Some of the papers read were of a very high order. The chief trouble was that there were so many of them as to make their thorough discussion out of the question.

The Secretary (Dr. Purdy) stated that not more than half the delegation of this Society was present at the Albany meeting, and he hoped some action would be taken upon it. The whole number of delegates in attendance was two hundred and fifty-four.

On motion of Dr. E. Eliot, it was voted that the Secretary report, at the next meeting, the names of the absentees.

Dr. J. C. Peters said that he was one of the delinquents. He had made his arrangements to attend the meeting, when an important case, demanding his care, rendered it impossible.

The meeting adjourned.

Electro-Puncture in Aneurism of the Aorta.—The September numbers of the *Gazetta Medica Italiana-Lombardia* contain four additional cases related by Drs. De Cristoforis and Machiavelli, in which electro-acupuncture was employed for the relief of aneurism of the arch of the aorta. They are related in considerable detail, and are of great interest, showing, at least, that the practice is an inoffensive one, and gives the patient relief from great suffering.

Bibliographical and Literary Notes.

I. *Transactions of the Medical Association of the State of Alabama.* Annual Session, 1869, held in Mobile, pp. 144.

II. *Transactions of the Twenty-fifth Annual Meeting of the Ohio State Medical Society.* Held at Cleveland, 1870, pp. 300.

III. *Proceedings of the State Medical Society of Michigan for the Years* 1867 *and* 1868, pp. 116.

IV. *Transactions of the Medical Society of New Jersey.* Held at Jersey City, 1869, pp. 197.

I. The Medical Association of the State of Alabama held its annual session in Mobile, March 2, 1869.

The valedictory address was delivered by Dr. W. H. Anderson; after which the President opened the session with a clear and erudite address upon the history of the medical profession.

The first scientific paper was read by Dr. R. F. Mitchell, of Montgomery, upon the "Hæmorrhagic Malarial Fever," the most prominent symptoms of which are the "yellow color," and the hæmaturia. The most common mode of death in this disease is by gradual exhaustion and wearing out of the powers of life, but sometimes there is uræmic poisoning, and in these cases the mode of death is either by profound stupor on the one hand, or uræmic intoxication, with delirium, coma, and convulsions, on the other. A patient died upon one occasion, solely by bleeding from the kidneys, which the doctor could not control; and another, in which the hæmorrhage from the Schneiderian membrane continued until death.

Dr. J. D. Seelye, of Montgomery, reported a case of *embolism*, and made a few remarks upon the literature of the subject. Dr. J. J. Wheatley, of the same place, read a paper upon the "Increase of the Habit of Opium-Eating." A report on "Climatology and Diseases of North Alabama" was presented by G. E. Kumpé, M. D., and R. F. Abernethy, M. D., in which they say that North Alabama has been free for the last year from epidemics of all kinds, as well as con-

tagious diseases; but that diseases of malarial origin have prevailed to a great extent; intermittent, remittent, bilious, and congestive fevers, have been very frequent. A fact worthy of remark is, that no case has occurred in the colored population.

A report on the "History and Progress of Surgery in North Alabama" was presented by Dr. John M. Clark, of Leighton.

The next report was presented by Dr. G. D. McDaniel, of Camden, upon the "Topography, Climatology, and Diseases of Wilcox County," and was followed by a report on the surgery of the same county, by Dr. Paul Jones. It contains the details of a case of osteo-sarcomatous tumor of the lower jaw, including the tongue and palate, so as to destroy speech, operated on successfully by Drs. McDaniel and Jones. Several cases of strangulated hernia, many cases of amputation, and, finally, a case of Cæsarean section, performed by Dr. T. K. Beck, upon a negro woman aged nineteen, and in which the child was dead before the operation; the mother died thirty-six hours subsequently.

Next, Dr. C. F. Tahs, of Selma, read a report upon the "Medical Properties of the Sulphites and Hyposulphites," in which the author praises these remedies very highly in the treatment of the malarial hæmorrhagic fever.

Then followed a paper upon "Miasmatic Fevers," by Dr. A. G. Mabry, of Selma; and another upon the treatment of relapses of malarial fevers, by A. C. Matheson, M. D., in which he recommends the use of arsenious acid made into pills and given in doses of one-twelfth of a grain three times a day.

The volume is closed by the Annual Address, by J. B. Gaston, M. D., of Montgomery, upon the question of "What is Life, or, rather, what are the Dynamical Agencies of Life?" The paper is a valuable one, but too lengthy and too philosophical for us to discuss in the time and space at our command.

II. The Twenty-fifth Annual Meeting of the Ohio State Medical Society was held at Cleveland, June 14 and 16, 1870. The President, Dr. S. M. Smith, after the routine business was terminated, addressed the Society, with a very sensible and erudite lecture upon "an Inquiry into some of the Faults and Defects in the Cultivation of our Profession."

One of the most important questions, and perhaps, in a degree including all others, says the speaker, is the *want of a genuine love of truth*—of truth for its own sake, fully accepting it as the vitalizing element. From the days of John Hunter's indignant protest against the "false facts," nothing has been better and more appropriately said than by Dr. Smith when, after repeating the words of Dr. Holmes, "the physician, when he makes an unnecessary visit, whenever he writes an unnecessary prescription, tells a lie," he remarks "much more untrue are all false pretences, whether spoken or acted; all superficial diagnoses, when the physician does not know what he pretends to know; all unwarranted prognoses and promises to cure; all claiming for treatment that which belongs only to Nature; all shallow excuses for bad practice." But how aggravated is this treason to truth, when these falsehoods are marshalled into the ranks of medical experience in books and journal articles, embellished by engravings, certified to by microscopic revelations, that others, more skilled, can never find; by chemical processes that violate the laws of chemical combinations; by reports of cures effected by medicines that prove inert or worse in the hands of others who administer them in the same diseases and in the same dose!

If "truth is the breath of life to human society," it is the essence of all science. "Shams" are its counterfeits, and they are to truth what galvanism is to life—motion, but not power.

The address shows that it emanates from a cultivated mind, and is animated by honesty and good sense.

The first paper in order was on "Surgical Applications of Carbolic Acid," by P. S. Connor, M. D., of Cincinnati. It is a succinct review of all that has been said about the acid. Dr. Connor remarks: "Three objections exist against its use upon and about the subjects of surgical treatment, viz., the odor of the acid, its unfavorable influence upon granulations, and the danger to life in its employment."

To the first objection, "the odor," we reply that, if the acid is well prepared, the odor is very slight, and, besides, habit very soon overcomes the dislike to the odor, so that in a short time it is hardly noticed. On the second objection, viz., "the

unfavorable influence upon granulations," we remark that we have used the agent upon a large scale in the treatment of all sorts of wounds and ulcers, and that we have obtained results from it that could not have been obtained better by any other dressing; in some cases it prevents suppuration, and causes wounds to heal by first intention, but we have never seen it stop entirely suppuration or granulation when the first had set in; it only diminishes suppuration and acts as a deodorizer, although the author says the contrary. "The danger of its employment" cannot be an objection; it is no more dangerous than any other preparation or remedy used daily in practice, and only requires the same care as any other poison.

As to the "black urine," which the author supposes is due to the destruction of the blood-corpuscles, hæmorrhage having resulted from local irritation, as well as the general spanæmic condition, we beg to remark that, although we have already heard of "black urine," produced by the use internally and externally of carbolic acid, we have never seen it, and, as we said before, we have used it upon a large scale in hospital as well as in private practice. May it not be that the coloration of urine is due to the simultaneous administration of sesquichloride of iron, which is a very delicate test for urine containing a very feeble proportion of carbolic acid, the effect of which is just to color it with a purple cloud, which very soon precipitates in a dark color?

The next paper was read by Dr. P. Beeman, of Iola, Kansas, upon the "Climatology and Diseases of Southwest Kansas." This paper is interesting both to the meteorologist and physician. The author remarks that the large prairie-fires occurring in the fall and winter have a great influence upon the production of miasmatic fevers; the quantity of carbonic acid produced by the combustion being equal to 300,000 tons daily for six months.

The next paper is the "Report of the Committee on an Anatomy Law for Ohio," who finally succeeded, after much labor, in securing the passage of "an act by the General Assembly of the State of Ohio," to encourage the study of anatomy.

"An Historical Review of Medical Organization in Ohio,"

by Edward B. Stevens, M. D., of Cincinnati, contains useful information for those interested upon the subject.

A paper on "Hæmatics" was read by Dr. E. H. Hyatt, of Delaware, Ohio. This paper, which is only a continuation of a previous one, is a consideration of the second division, or *catalytic* order of hæmatics. The theory consists in using a certain class of remedies that act by destroying the morbid material of the blood, or by counteracting the morbid process which may be going on in that fluid, and then pass out of the body, being unnatural to it. Each catalytic has peculiarities and affinities which distinguish it from all others, and each tends to work out a peculiar process in the blood.

According to the author's theory, catalytics act contrary to restoratives, the property of these being to restore to blood the lack of its constituents, while the property of the first would be to have an affinity for disease, and, not being themselves by their nature constituents of the blood, would draw out disease from the blood, as a loadstone draws out parcels of iron, and discharge it through the secretions. This, at least, is the manner in which we understand the ideas of the author. It is a very inviting theory, but which must yet be proved by experience.

The next report is on vaccination, by W. B. Davis, of Cincinnati; its chief object is to prove that vaccine virus is not deteriorated by passing and repassing through the human system, and that it gives greater protection against small-pox than animal vaccination. Dr. Davis shows that the vaccine virus is a specific of itself, and will not mix with the syphilitic virus, and repeats Dr. Anstie's well-known aphorism, that vaccine syphilis is a bugbear and a phantom.

We agree wholly with the views emitted in the report, but we must say, when vaccine lymph is *taken carefully*, even from a syphilitic subject, there is no danger; but how many careless practitioners I have seen take what they call lymph, on the tenth or eleventh day, and who, instead of taking the pure vaccine virus, take blood and matter, and with those materials inoculate syphilis, instead of vaccine, and are really the cause of these everlasting discussions!

Dr. O. G. Seldon, of Shanesville, Ohio, then read a paper

on Pneumonia. Although the paper does not contain any thing new about the disease or treatment, we must congratulate the author on being a supporter of the restorative treatment, which proved so favorable in his practice as well as it does with any one using it rationally.

The next paper in order was, "The Importance of a Concerted Account of the Prevailing Diseases and their Management throughout the State," by J. R. Black, M. D., Newark, Ohio. This report is of special interest only to the profession of Ohio, and therefore we do not undertake to discuss it.

The following paper is an interesting "Report on the Temperature of Certain Nervous Diseases," by W. J. Conklin, M. D., of Dayton, Ohio. The author shows by numerous statistics the irregularity of temperature in lesions of the nervous centres in nervous diseases. The extremes of temperature, says he, are met with in lesions of the nervous system. Concussion of the brain and shock giving the lowest and tetanus the highest temperatures on record. In one case of fracture of the twelfth dorsal vertebræ, fourteen months after the accident, sensation being natural and paralysis of motion still existing, the thermometer gave the temperature of the upper extremity $99\frac{3}{4}°$ Fahr., while that of the lower extremity was only 78° Fahr., making a difference of $21\frac{3}{4}°$ Fahr. between the two extremities. A record of temperature in cases of mania, chronic mania, melancholia, puerperal insanity, phthisical insanity, and epileptic insanity, is worthy of attention, and will be consulted with benefit.

The book closes with a paper on "Cantherism," by Dr. Alex. McBride, of Berea, Ohio; a "Report on Obituaries," by E. B. Stevens, M. D., of Cincinnati; a "Poem," by J. M. Brown, M. D.; "The Constitution of the Ohio State Medical Society," and, to crown the edifice, "The Eternal Code of Ethics of the American Medical Association, adopted by the Ohio State Medical Society."

III. "The Proceedings of the Michigan State Medical Society" contains very little matter of real interest, except a "Report on Obstetrics," by Prof. A. Sager, M. D. In this report there is a record of a case of tubal pregnancy; the

patient died of syncope on the fourth day. At the *post-mortem* examination, there was found near the middle of the right Fallopian tube, a globular enlargement about an inch in diameter, containing an ovum about five or six weeks old. There is also a case of uterine fibroma. The tumor was elliptical in form, six inches in length, and four in transverse diameter, and weighed one pound and a quarter. It was a solid mass, having the well-marked fibrous structure of uterine fibroma. A "Report on Diseases of Women," by B. W. Jenks, M. D., of Detroit; a "Report on New Remedies," by Dr. S. P. Duffield, recommending the *viburnum prunifolium* in threatened abortion and uterine hæmorrhages; a "Report on a New Preparation of Opium," by J. M. Bigelow, of Detroit, which is nothing but a combination of morphia, narceia, and codeia, which he calls *purified opium*. There is not much novelty in this combination, nor can we approve of the name given to it any more than we could the term "purified cinchona" to a mixture of quinine, cinchonine, and quinoidine. There is a paper upon the "Need of General Vaccination," by Dr. H. F. Lister; and one on "The Zymotic Diseases," by Dr. E. P. Christian, in which we find a report on an epidemic of diphtheria, the cases of which were mostly mild ones, but a few were of a malignant type. The doctor regards it as a disease in which the danger of death in adults is but slight. "The treatment which I have found uniformly successful," says the author, "since I have adopted it, has been large doses of quinine and tannin, with a wash of saturated solution of tannin, and occasionally, in obstinate cases, a wash of biniodide of mercury, dissolved in solution of iodide of potash, one grain of the former and ten grains of the latter, to eight drachms of water, to be used as a gargle, or, in young children, on a swab."

Altogether, in congratulating the doctor for his lucky treatment of a disease which he considers of very little danger to adults, although many of our *confrères* died of it, and among them Blache and Valleix, we must also say that in our opinion diphtheria is one of the most fatal diseases, and that there is a very bad habit contracted by some physicians, in designating as diphtheria every kind of sore-throat, be it angina, gangrene

of the mouth, and even aphthæ and thrush. We would urge such persons to read the address of Dr. S. M. Smith, of Columbus, Ohio, in the Transactions of the Ohio State Medical Society noticed above.

IV. The annual session of the New Jersey Medical Society was held at Jersey City, May 25, 1869, being its one hundred and third annual meeting.

Dr. T. J. Corson, President, addressed the Society upon the subject, "Physician and Patient: their Relative Duties, Rights, and Privileges." The address is not, as might be supposed from the title, a repetition of the subjects which resulted in the "code of ethics," but is really a philosophico-humoristic paper, filled with truth and good sense. He urges upon the physician constant study and faithful and punctual attendance to his patients. "An ignorant physician," says he, "is more dangerous than a pestilence. One who would successfully practise the healing art must be a close student all his life;" and further: "Every physician is solemnly bound to give assiduous care and punctual attention to those who come under his charge. . . . . He, who thus, without good and sufficient cause, disappoints one who is suffering from the weariness, languor, and *ennui* of disease, is guilty of gratuitous cruelty." As to the business view of the question, he says that physicians are too negligent in requiring payment for their services, they allow their claims to run so long that when they go to ask of their debtors their just dues, they go about it as if they were performing a small and dishonorable action, and solicit what they have honestly earned as if begging a great favor, instead of demanding the performance of an act of too-long-delayed justice. The author touches upon other delicate points of deontology, which makes the paper an interesting and valuable one.

The first paper in order was an "Essay," by Dr. Ch. Hasbrouck, upon the apparent uncertainties of medicine, as seen in the conflicts and discrepancies of medical opinions and practice. The author attempts to show the differences of opinion existing among physicians about diseases and their treatment. He says judiciously: "The most careful student

of our current medical literature must have observed that there is scarcely a disease, of sufficient importance to receive a notice in the medical journals, upon which there does not seem to exist in the profession the greatest diversity of opinion, both as to its pathology and to its treatment; and perhaps there is nothing which tends so much as this to impair the confidence of the public in the claims of medicine, as a science, as a profession, and as an art."

This is all true to a certain degree. Medicine is a science, but an *inexact* science. The same elements do not, as in chemistry, for example, produce the same effect, even if apparently in the same conditions; and we all know that the same diseases, pathologically speaking, do not always furnish the same symptoms; also that medicines will not produce always the same effect upon different subjects attacked by the same disease, and given for the same indications; it is that there are idiosyncrasies, and a nervous system which is acting differently in all subjects; thus, sources of error are infinite in practical medicine, owing to the many conditions and multiplied elements contained in the constitution of morbid facts in general, and of each patient in particular.

A "Report of the Standing Committee" is presented by Drs. Stephen Wickes and J. T. Culver, and contains reports of fourteen counties and an appendix on "The Hygrometer, a Plea for its General Use," by J. T. Culver, M. D.

In the "Reports of District Societies," we find an interesting paper on "Carbolic Acid," by Dr. C. F. J. Lehlbach, of Newark, New Jersey. The author gives an elaborate report upon the different applications, internally and externally, of carbolic acid, with the results of his own practice. The only new feature we find about it is the use of the acid in the form of powder: it is mixed, and well triturated, one part to one hundred, with sugar of milk, and given thus, in the desired dose, it is, we think, a very good preparation. Carbolic acid has a great affinity for sugar, and the saccharate of phenyl, as it might be called, will keep a long time if well corked up.

Art. V.—*Lay Sermons, Addresses, and Reviews.* By Thomas Henry Huxley, LL. D., F. R. S. New York: D. Appleton & Co. 12mo, pp. 378.

In this volume Prof. Huxley has collected his various miscellaneous essays, spoken and written, and its reprint will be acceptable to a large body of American readers, among whom he has many admirers. The freshness and logical clearness of his style, a happy faculty of illustration, and a manliness and honesty of purpose constantly shown in the alacrity and keenness of his battle against all shams, have made him a very popular teacher, and won for him a host of supporters, who are but little minded either to question the correctness of the propositions, or to inquire whether the inferences are ever hasty, and not always warranted by the argument. He has, moreover, gained a strong hold in the hearts of the masses as the apostle of social progress, and an upholder of the education of the senses; which so surely develop natural intelligence, and permit us to reach a degree of knowledge which is practical power, thereby increasing the actual working capital of a people. Though the instinct and spirit of Prof. Huxley's mind are German, the expression, in its simplicity and directness, is thoroughly English. If, sometimes, in reading his discourses and reviews, we have got a little impatient, it is because we do not think that injurious words or dogmatic assertions should take the place of facts and reasoning; that we believe there are things which cannot be touched through hearing and sight; that there is more than this physical philosophy can or ever will be able to explain, and which often make its speculations vain and its hypotheses dark; and that the pride of science may be as equally intolerant and misleading as the pride of faith. It cannot be too well remembered that the accepted theory of to-day may become a fiction as well as a fact to-morrow. When Mr. Huxley affirms that his only ambition is to "always think what is true and to do what is right," we know that his whole life bears witness to the assertion; but when, to prove the sincerity of the declaration, he expresses his willingness to be converted into a "machine," if some great power would agree to bestow these gifts upon him, we can only express the hope that no opportunity will be ever given to him

to close with any such bargain, for the world just now could ill-spare his active and comprehensive intellect, even though the possible result of the transubstantiation might be the solution of the problem of perpetual motion.

After earnestly counselling the "advisableness of improving natural knowledge," and justifying his views by familiar illustrations, and showing that the outgrowth has been the remodelling and altering of what may be termed the intellectual ethics of men, Prof. Huxley boldly affronts one of the great social questions of the day, and asks, "What social and political rights have women? What ought they to be allowed, or not allowed to do, be, and suffer? And, as involved in, and underlying all these questions, how ought they to be educated?" The result, though loath to prophesy, he believes will be, that "women will find their place, and that it will be neither that in which they have been held, nor that to which some of them aspire;" and he adds these cheering words to those who are good enough to take the trouble and responsibility of maintaining the population of the world: "We are, indeed, fully prepared to believe that the bearing of children may, and ought, to become as free from danger and long disability to the civilized women as to the savage; nor is it improbable that, as society advances toward its right organization, motherhood will occupy a less space of woman's existence than it has hitherto done. . . . . Sydney Smith is said to have suggested that it would have been good for the human race, had the model offered by the hive been followed, and had all the working part of the female community been neuters." For ourselves, we hardly hope for the millennium of woman, until the more general acceptance of the "couvade," a custom, as we learn from Sir John Lubbock, among many races, where, when a baby is born, the father and not the mother is "doctored."

The excellent chapters on "A Liberal Education; and where to find it," on "Scientific Education," and on "The Educational Value of the Natural History Sciences," commend themselves by the many practical views they contain, and the telling manner in which they are put in the crisp English of the writer. Of all the essays in this volume, the

one which we have read the oftenest, and with the most liking, is "On Descartes' Discourse, touching the method of using one's reason rightly, and of seeking scientific truth." To our notion, it outweighs greatly the famous "Physical Basis of Life." The last article is the Address delivered before the British Association for the Advancement of Science, at its last meeting, of which Prof. Huxley was president, and in which the subject of Spontaneous Generation is treated of. He exhibits but small partiality to the hypothesis of Abiogenesis, and shows perhaps undue favor to the germ-theory, or at least assigns to it a universality of action as yet unproved.

We shall conclude this notice by two characteristic extracts from this interesting volume on subjects which are at this time engaging largely the attention of the profession, and which give an excellent idea of Prof. Huxley's manner:

We have learned that pestilences will only take their abode among those who have prepared unswept and ungarnished residences for them. Their cities must have narrow, unwatered streets, foul with accumulated garbage. Their houses must be ill-drained, ill-lighted, ill-ventilated. Their subjects must be ill-washed, ill-fed, ill-clothed. The London of 1665 was such a city. The cities of the East, where plague has an enduring dwelling, are such cities. We, in later times, have learned somewhat of Nature, and partly obey her. Because of this partial improvement of our natural knowledge and of that fractional obedience, we have no plague; because that knowledge is still very imperfect, and that obedience yet incomplete, typhus is our companion, and cholera our visitor. But it is not presumptuous to express the belief that, when our knowledge is more complete and our obedience the expression of our knowledge, London will count her centuries of freedom from typhus and cholera, as she now gratefully reckons her two hundred years of ignorance of that plague which swooped upon her thrice in the first half of the seventeenth century (p. 9).

And again:

Looking back no further than ten years, it is possible to select three (1863, 1864, and 1869), in which the total number of deaths from scarlet fever alone amounted to ninety thousand. That is the return of killed, the maimed and disabled being left out of sight. Why, it is to be hoped that the list of killed, in the present bloodiest of all wars, will not amount to more than this! But the facts which I have placed before you must leave the least sanguine without a doubt that the nature and causes of this scourge will, one day, be as well understood as these of the Pébrine [a cholera-like disease of the silk-worm, said to be due to the growth and

multiplication of certain cylindrical corpuscles named by Lebert *Panhistophyton*, which swarm in every tissue and organ of the body of the worm, and even pass into the undeveloped eggs of the female moth] are now, and that the long-suffered massacre of our innocents will come to an end.

And thus mankind will have one more admonition that "the people perish for lack of knowledge;" and that the alleviation of the miseries and the promotion of the welfare of men must be sought, by those who will not lose their pains, in that diligent, patient, loving study of all the multitudinous aspects of Nature, the results of which constitute exact knowledge, or science" (pp. 377, 378).

ART. VI.—*Body and Mind: An Inquiry into their Connection and Mutual Influence, specially in Reference to Mental Disorders; being the Gulstonian Lectures for* 1870, *delivered before the Royal College of Physicians. With Appendix.* By HENRY MAUDSLEY, M. D., London, etc., etc. London: Macmillan & Co. 1870. 12mo, pp. 189; and New York: D. Appleton & Co. 12mo, pp. 155.

THE object of these lectures, and the two reprinted articles which form the Appendix, is to bring man, both in his physical and mental relations, as much as possible, within the scope of scientific inquiry. The first lecture is devoted to an exposition of the physical conditions of mental function in health, or to a general survey of the physiology of mind. In the second are sketched some forms of degeneracy of the mind as shown in morbid varieties met with in man, with the purpose of bringing forward prominently the fact of the operation of physical causes from generation after generation, and the relationship of mental to other disorders of the nervous system. The pathology of the mind is rapidly gone over in the last lecture, and the relations of morbid states of the body to disordered mental conditions clearly exhibited. The general result of these inquiries will be, the author believes, "a well-warranted conclusion that, whatever theories may be held concerning mind and the best method of its study, it is vain to expect and a folly to attempt to rear a stable fabric of mental science without taking faithful account of physiological and pathological inquiries into its phenomena."

In a recent number of the JOURNAL (November, 1870, p.

466), we printed the peroration of these lectures, and invited the attention of our readers to it; and we can now cordially recommend to their reading and study the present volume, both for its matter and style.

Dr. Maudsley has added a criticism, written for and published in the *Journal of Mental Science*, of which he is editor, on the Archbishop of York's Edinburgh address on "The Limits of Philosophical Inquiries," so well known for the treatment it received at the hands of Mr. Huxley, in his celebrated "Protoplasm" lecture. The good temper, biting humor, and inexorable logic, of this review of the archiepiscopal address, contrast favorably with Prof. Huxley's hard hitting and punishment, which too often bring to mind more the prize-fighter than the philosopher. After completely disposing of the heavy charges laid against modern science by his Grace, "made in a thoughtless rather than a bitter spirit," Dr. Maudsley continues:

"On the whole, we think, there is less reason to apprehend harm from this discharge of the archbishop's feelings than to apprehend harm to those who are obstinately defending the religious position against the attack which is thought imminent, for he has used his friends badly; he has exposed their entire flank to the enemy. While he would distinctly have philosophy concern itself with the highest subjects—God, freedom, and immortality—despising a philosophy which forbears to do so, and pointing out how miserably it falls short of its highest mission, he warns philosophy, in the same breath, that there is a point at which its teaching ends. . . . The pity is that we are not furnished with a word of guidance as to where the hitherto and no farther point is . . . in shutting off philosophy entirely from the things that belong to faith, the Church of Rome occupies a strong and almost impregnable position; for, if there be no reading there will be no inquiry, and if there be no inquiry there will be no doubt, and if there be no doubt there will be no disbelief. But the union of philosophical inquiry and religious faith is not a natural union of kinds, and it is difficult to see how the product of it can be much different from the hybrid products of other unnatural

unions of different kinds—can be other than sterile, when it is not monstrous" (p. 142).

The last essay on "The Theory of Vitality" was published in the *British and Foreign Medico-Chirurgical Review*, 1863. In view of the present reëxamination of the subject, which will probably result in some modification of the theory which has most generally prevailed for some time past, we have doubts of the expediency of its republication. Of all the contents of the volume, it is the one least likely to secure common assent.

Art. VII.—*Syphilis and Local Contagious Disorders.* By Berkeley Hill, M. B., London, F. R. C. S., Assistant Surgeon to University College Hospital, etc. Philadelphia: Henry C. Lea, 1869. 8vo, pp. 467.

Careful perusal of this work has resulted in the discovery of but little that is new either in the description or treatment of venereal diseases; its merit is therefore to be sought in the arrangement of its subject-matter. The introduction of a "Summary" at the close of the chapter is of great benefit to the reader, enabling him to fix the more important points in his memory, without burdening his mind with the details already treated of.

The question of vaccination as a cause of syphilis is discussed at some length, and the arguments brought forward have convinced, at least, their author. He seems to indorse the views of Viennois, that it is the blood and not the lymph which is the vehicle by which the syphilitic poison enters the system. We would be interested to know whether Mr. Hill's views have been modified by the results of the recent discussions in the French Academy of Medicine.

It is to be regretted that syphilographers do not agree in the terminology employed to distinguish the local ulcer from that which is followed by constitutional symptoms. We are convinced that nothing so confuses the beginner as the indiscriminate use of the word "chancre." The term "chancroid" seems to be the most useful yet proposed. Its adoption would prevent any possibility of confounding the non-indurated with

the indurated ulcer; and it furnishes us with an adjective, "chancroidal," which enables us to express our ideas much more concisely, and consequently more intelligibly, than we are otherwise compelled to do when we speak of the attributes of the "soft chancre," the "virulent ulcer," or the "local contagious ulcer."

The work is a convenient one for reference and study, but has no advantages over that of Bumstead, which indeed has the merit of being the more recent. It is rare in the history of medicine to find any one book which contains all that a practitioner needs to know. No one is contented unless his library contains West, Bouchut, Vogel, and Smith, on "Diseases of Children;" Flint, Niemeyer, Aitken, and Reynolds, on the "Practice of Medicine;" and would not feel justified in performing an operation of any magnitude till Erichsen, Gross, or Holmes, had been consulted; while the possessor of "Bumstead on Venereal" has no occasion to look outside of its covers for any thing practical connected with the diagnosis, history, or treatment, of these affections.

ART. VIII.—*St. Andrew's Medical Graduates' Association, Transactions*, 1869. Edited by LEONARD W. SEDGWICK, M. D., Honorary Secretary. London, 1870, 8vo, pp. 306.

ON the whole, this is a very creditable volume, and some of the papers are of unusual excellence. The Anniversary Address by Dr. B. W. Richardson, President of the Association, on the "Science of Cure," like every thing from the pen of this accomplished physician, is full of good thoughts. It is a timely, and, as we believe, a proper vindication of the real power of medicine, from that common infidelity of the day held by too many of its disciples, and which, embodied in a wrong interpretation of the specious conceit of Ambrose Paré—"I treat them, God cures them"—proclaims really the meaninglessness of physic, and an abject confession of our uselessness and cheats. This view, that the issue of the cure has no absolute relation to the skill of physicians as curers, Dr. Richardson casts aside "as contemptible, false, and wicked. . . .

The idea is preposterous; if we cannot say boldly as truthfully that we live to cure, it were better for us not to live at all under the pretence of being curers." If there is yet a limitation to our power for effecting cure, it is "not due to impossibility of effecting more, but to our defective skill in carrying out what might be done. If we can cure ague or secondary syphilis, and we can cure both, we ought to be able to cure typhus or cancer. . . . Success in one direction proclaims the possibility of equal success in other directions, and leaves us conscious of all the unknown in our vocation." The question, "Why are we so long tarrying in our way to successful progress?" is well considered under the head of obstacles to advancement. Foremost among these hinderances is the respect for individual experience as distinct from general experience, which should be patent to all and convincing to all. The former is really valueless, and is after all little more than "unknown coincidence running by the side of supposed curative application." General experience is the expression of common truth, but individual experience, which cannot be generalized, is "special and undisguisable error, superficial observation, and that pride of self-sufficiency which my Lord Verulam has justly stamped as the idol of the den." Though we cannot wholly accept this view, for general experience must be the sum of individual experiences, it must be admitted that the system of airing individual experiences, so common in our medical bodies, happily described as "contention, contradiction; words, words, words," is worthless, and has too often no better result than the discredit of medicine and of ourselves.

The natural cure of disease, one of the most pestilent fancies of the medicine of the period, finds no favor with the writer. "The *vis medicatrix naturæ*, what is that? Is it a word, or a fact? We dwell upon it as if it were a fact; we dwell upon it as if it were a principle upon which we can often rely altogether, and on which we can always rely to some considerable extent. Is this correct belief?" We have before had occasion to express our opinion concerning this hypothesis of natural cure, and attempted to show its fallacy and perils. We claimed that Nature never showed intelligent action in its struggle with disease, but only blind instinct, lacking

both method and measure (vol. iv., p. 58). Dr. Richardson holds, as we do, that the belief has no basis whatever, and that "Nature goes her own way without putting out any hand to us for our special and particular aid. . . . To trust to what is called Nature, to the omission or neglect of scientific methods for cure, is to forsake the path of duty, and leave to chance that which strictly falls under the exercise of reason. The trust is fatalism in physic; fatalism extended beyond our own interests, to the life interest of those who submit themselves to our care. . . . What natural process of cure is to be seen, acting as a general principle, to be expected or to be relied on, in such maladies as tubercular phthisis, cancer, syphilitic ulceration, hydrocephalus, ague, tetanus, cholera, hydrophobia? Is that a cure which leaves the sufferer from acute rheumatism with a disabled heart, or the patient under scarlet fever with structural change of kidney? Does Nature or art cure ovarian dropsy or cataract? To the issue straightway. What does Nature cure? I for one confess not to know. . . . In following out our business of treating disease we are bound to let no shrinking from labor or other cowardly device win us from the consciousness that whenever we leave disease to what we glibly call Nature for cure, we confess ourselves to be what we are, incapable men, invoking an incomprehensible and indefinite aid."

Another paper by Dr. Richardson, "On Intermittent Pulse and Palpitation," is of much practical value. It treats of that form of cardiac irregularity which consists of an absolute loss of certain of the normal pulse-strokes, and covering a variable time. The seat of this derangement might be in the ganglionic centres of the heart itself, or from irritation in the periphery or in the branches of the pneumogastric, but Dr. Richardson believes the primary mischief to be in some mental centre of the nervous system, and an indication of failing power. In the old and very young it always presents itself with other indications of mental derangement or feebleness, but the mode in which it appears in the prime of life is strongly in favor of this view of its origin; in such cases it is always traceable to some form of mental excitement with succeeding depression, as sudden grief, shocks from failures in

business, disappointments, outbursts of passion, remorse, degradation, and, most fruitful cause of all, overwork and worry. A number of interesting cases are given in support of this hypothesis. In answer to the question, "Where is the seat of the nervous lesion which causes this intermittent action, and what is its nature?" Dr. Richardson asserts that the cause is a failure of the sympathetic supply to the heart, and that its origin is not strictly cerebral. He accepts the proposition that the centres of the great ganglionic system are either the distinct centres of the emotional faculties, or that there is a direct connection between the sensorial organs and the sympathetic, so that emotions received through the senses are at once transmitted to the organic centres. Of the nature of this failure of the implicated nervous centres, reservoirs of derived force, we can only guess that intangible molecular changes, causing deficiency of retaining power, and hindering persistent carrying on of allotted function, happen, the result of which is an inadequate supply of the reserve contractile power of the heart. Of the significancy of this symptom, Dr. Richardson says: "Occurring in infancy, it is an important indication of the existence of serious nervous derangement. Occurring in adults, . . . it tells the story of commencing failure of power. Occurring suddenly after any great event which has told upon the mind, it may be a sign of serious import. My own experience connects it as the first physical indication of derangement in three cases of disorder of the mind in which suicide was attempted. . . . Further, it becomes an embarrassing sign in all conditions where there is diminished condensation of force in the nervous centres, where force is either not laid up or given out too freely." In a large majority of cases there is unconsciousness of the intermittence by the patient; in such the phenomenon does not cover more than one or at most two normal periods of cardiac contraction, and there is a long interval before the return of it. Where the period is equal to five normal strokes, and repeated at short intervals, then the subject is often painfully conscious of the fact. In the valuation of this symptom the author writes: "Whenever it is persistently present, the actual value of life, as compared, *cæteris paribus*, with the life of another person who has no such symp-

tom, is reduced; the power for work is less; the power to meet extremes of heat and cold is less, and the power to meet the anxieties and calamities of life is less. The man or woman with a hesitating heart is thereby unfitted for sudden tasks, demands, resolves, which, when the heart is firm, we considered as comparatively of little moment. . . . From these circumstances some persons, who once were known as resolute and determined, lose those qualities when they are subjected to intermittent action of the heart, becoming uncertain and doubtful in character, . . . less the masters of themselves, and less secure in their own work, and skill, and power." They pass through all acute diseases illy and with less chance of recovery than others not so afflicted; they sink more readily after surgical operations and injuries, from influenza, inflammatory attacks, and especially the continued fevers. "Thus the phenomenon, symptom though it be, is of moment; . . . if two men, of equal age, build, education, and power, were put into contest, mental or physical, and the one had, and the other had not, intermittent pulse, the chance of success is altogether in favor of the man whose heart is not intermittent." It does not appear to directly shorten life. One of Dr. Richardson's patients, who died at eighty-six, had had an intermittent pulse since he was forty-two. In persons past middle life, the symptom, when once fully developed, is persistent. The general line of treatment consists in avoidance of mental excitement and overwork; keeping the patient's attention from himself or his ailment; the subduing of nervous irritability by a single full dose of opium. In cases of sudden intermittence, with symptoms of cerebral congestion, the abstraction of a moderate quantity of blood from the neck by cupping-glasses, a purgative, and a blister to the nucha, are to be used. In those cases in which intermittent pulse is connected with general prostration and general breaking up of the body, where there is chronic organic disease, or general systemic disorder, iron and morphia do good service. In answer to the question, how far alcohol is useful, he advises, as the result of repeated experiences, all who so suffer to abstain from it in every state as far as possible.

Another article, entitled "A Study of Convulsions," by Dr.

J. Hughlings Jackson, is worthy of a more extended analysis than our space permits. It is more properly a study of one class of chronic convulsive seizures, namely, those in which the fit begins by deliberate spasm on one side of the body, and in which parts of the body are affected one after another. Unilateral convulsions are the simplest varieties of occasional spasm we can find. For instance, there is first a movement of the index-finger, then of the hand, then of the whole arm, then of the face, leg, etc. A fit of this kind may last ten minutes, and the patient can describe the onset and much of the march of such seizures. We can compare and contrast these convulsions with hemiplegia—which form of palsy the convulsion not unfrequently leaves. In some of these cases *gross* disease of the brain can be found *post mortem*, as syphilitic nodules, and in others the changes escape all methods of investigation. In the former we have a knowledge of the internal part diseased, and a record of events as happening in a certain kind of convulsion, and we can infer the seat of the minute changes on which the discharge producing the spasm was dependent. We are thus freed from the great vagueness of the word "epilepsy." The chief object of Dr. Jackson in this paper is to show that the most common variety of hemispasm is a symptom of disease of the same region of the brain as is the symptom hemiplegia, viz., the "region of the corpus striatum." Hemiplegia shows damage (equivalent to destruction) of the motor track, hemispasm shows danger (equivalent to changes of instability) of the convolutions which discharge through it. Palsy depends on destruction (meaning functional demolition) of *fibres*, and convulsion on instability of gray matter. The convolutions, rich in gray matter, are believed to be to blame, in severe convulsions at least, but in the slighter the corpus striatum, containing also much gray matter, may sometimes be to blame also. The discharge beginning in the convolutions, the gray matter of lower motor centres, even if these centres be sound, will be disturbed by the violent impulse received from the primary discharge. It should be borne in mind that many convolutions and the corpus striatum receive their supply of blood from one artery, the middle cerebral or Sylvian, and that this includes the region involved.

The muscles which suffer most are those which act independently of their fellows of the opposite side; or the fact may be put differently, and we may say that parts suffer directly as the actions they engage in are voluntary, and inversely as the actions they engage in are involuntary. This, too, is seen in the order of recovery. Fits beginning unilaterally may begin by movement in any part of the region which is paralyzed in ordinary hemiplegia, i. e., due to injury of the corpus striatum. The fit usually begins in that part of the face, arm, or leg, which has the most varied uses. These parts are represented in the nervous centres by most ganglion-cells. The seizures occur in all degrees, but three may be taken for study: 1. The spasm attacks only the unilateral muscles of the side in which it begins. 2. It passes on to the bilateral muscles of both sides. 3. It goes still further and attacks the unilateral muscles of the other side, and probably the bilateral muscles of both sides a second time. The spasmodic movements are not contemporaneous, but have a distinct sequence according to the starting-point. We should therefore note, first, the part involved, and, second, the order in which the parts are affected; as, for instance, the spasm begins in the hand, passes up the arm, attacks the face, and goes down the legs; or, if beginning in the foot, pursues an inverse order, "and goes out" at the fingers.

After some remarks on tongue-biting, which is no sign of "epilepsy" in particular, for it is found in convulsions from uræmia and cerebral hæmorrhage, indeed, in all cases of convulsion when the convulsion is severe, Dr. Jackson speaks of the absence of insensibility in convulsions; for, in the kind of cases under consideration, there is often no loss of consciousness, though the patient may be speechless throughout the attack. So far as he has been able to ascertain, the rule is, that (when the fit begins in the hand) consciousness is lost as soon as, or just before, the leg is seized, but sometimes the whole side may be affected, and even the thoracic muscles slightly, without any loss of consciousness. The late Dr. Addison held that absence of insensibility or convulsions is some evidence of material lesion, as tumor, for instance. To this opinion Dr. Jackson cannot subscribe, though in all such

cases he has found organic disease, and believes that "such convulsions point only to minute changes involving instability in the opposite hemisphere;" or at least to *local* changes of instability. They tell nothing of the pathological processes by which that local instability results; that is, they do not inform us whether the changes are primarily minute, or secondarily minute—changes due to the irritation diffused from coarse disease, a foreign body for instance, as a syphilitic lump, tumor, blood-clot, etc. The writer says:

"If the patient have severe pain in the head—not the mere sequel of a convulsion—if he have vomiting, above all, if he have double optic neuritis, I should then think it probable that the convulsion depended on changes diffused from a foreign body in the brain. If he have no such symptom, I should suppose the local change not diffused from a foreign body."

Next follow some interesting observations on "Temporary Defects of Speech, with Convulsive Seizures." Dr. Jackson has found that, when persistent loss of speech happens with hemiplegia, the hemiplegia is nearly always on the right side. He has noticed, too, in cases of spasm beginning on the right side, the defect of speech is more marked than when it begins on the left, particularly when it starts in the face and tongue of the right side; and that, when it begins in the right hand or right foot, it usually is not. This is given as an impression only, and he begs those who may see patients in such seizures, or immediately afterward, to note the nature and degree of the defect of speech; and the patient, it may be added, should also be requested to write and read. Cause of convulsions beginning unilaterally is discussed under the following heads: 1. The seat of the internal lesion. 2. The nature of the changes in the nerve-tissue on which the spasm *directly* depends. 3. The pathological process from which these local changes result. 4. The circumstances which may determine a paroxysm. The fact that the symptoms are local implies that there *is* of necessity a *local* lesion; one-sided spasm, or spasm beginning in one side, implying *local* change in the central nervous system as surely as one-sided palsy; and those convulsions which begin in one hand or in one side of the face,

and which affect the side of the body they commence in, before the spasm spreads to the bilateral muscles, and to the unilateral muscles of the other side, are disease of the opposite side of the brain in the Sylvian region. This proposition is argued with much force and ability, and all probable objections fairly met. The functional nature of the damage of nerve-tissue thus localized depends on changes of instability there seated, which permit an occasional excessive discharge on muscles. This instability may attend any kind of lump, or happen from causes altogether different, as changes produced by embolism, and changes diffused from coarse disease; but it may equally result from pathological processes we cannot detect. Two factors may be considered as determining the paroxysm: 1. Permanent local instability. 2. Something which determines the discharge of the part unstable—the provoking agents.

This valuable and suggestive paper is worthy of careful study.

We are able to do little more than to mention the remaining articles by their titles. "The Clinical Examination of the Urine in relation to Disease," by C. Black, M. D., contains the conclusions which a long series of clinical investigations has led to. It has been reprinted, and we hope to notice it more fully at another opportunity. Some interesting "Observations on Haschish," by Prof. Polli, are contributed by Drs. Richardson and L. W. Sedgwick. "Notes on the Therapeutic Value of the Chloride of Ammonium," by W. Cholmeley, M. D., tell us of the writer's experience with a medicine yet but too little used, and to whose good service in many disorders we can bear testimony after constant use of it for many years. Dr. Cholmeley believes that its effects may be attributed to its action on the nerves, and especially on the vaso-motor nerves. "Remarks on Therapeutics," by William Procter, M. D., call for no especial notice. A short paper on "Aphasia and its Seat," by S. Lawrence, M. D., gives a case in which that part of the brain to which Broca has assigned the faculty of language "was found after death the seat of extensive disease, which in a more restricted form must have been in existence nearly five years without producing any sensible impression on the power of speech." Here we have

another case to show that disease of the third left frontal convolution and aphasia do not hold the invariable relation of antecedent and consequent. In connection with this subject, Dr. Procter suggests that we ought to endeavor to ascertain why atheroma manifests such an affinity for the left cerebral arteries over the right, a fact pretty well established, and the overlooking of which has done something toward leading to the adoption of hasty views by Broca and his followers. A practical paper "On Gastric Neuralgia," by W. H. Day, M. D., "Cases of Melanosis," by William Norris, M. D., "Points to be observed in Ovariotomy," by D. Lloyd Roberts, M. D., of Manchester, and "Prurigo and Pediculosis or Phtheiriasis and the connection with Pediculi," by Tilbury Fox, M. D., are the titles of the other articles.

Art. IX.—*Materia Medica for the Use of Students.* By John B. Biddle, M. D., Professor of Materia Medica and Therapeutics, in the Jefferson Medical College. Fourth edition, revised and enlarged, with Illustrations. Philadelphia: Lindsay & Blakiston, 1871. 8vo, pp. 385.

Some two years since we put on record, at length, our estimate of Prof. Biddle's Materia Medica, and have no occasion now to materially alter the opinion then formed. This edition is prepared with great care; and descriptions of a number of new articles, as well as of some older and well-tried agents, which were omitted in the previous editions, are introduced. Improvements are taking place so rapidly in pharmacy that it has also been found necessary to revise, in a large degree, the whole work, and also to introduce much new matter. These changes and additions have materially enhanced the value of Dr. Biddle's book, and adapt it still more closely to the uses for which it was intended. We accept it, as previously, as an extended syllabus, rather than as a complete work on materia medica; and in the hands of a judicious teacher, or a properly-trained student, the book will prove serviceable. This we know from an extended use of it in teaching; but we cannot deem it wise to make the book do duty for the more elaborate and systematic treatises on materia

medica. It should serve as a frame-work around which a competent teacher or student will group the materials which make up the more perfect study he is engaged in. To those especially who sit under Prof. Biddle's instruction the book is of inestimable value; to others it will be of value just according to the use made of it.

No more accomplished student of comparative anatomy than Mr. Flower is to be found. His contributions to the *Journal of Anatomy* are always excellent, and are marked with a degree of thoroughness that cannot be too highly commended. In the present work[1] we notice the same completeness and thorough knowledge of the subject.

As the very basis of anatomy, osteology is of peculiar importance, and in its paleontological relations the science cannot be overestimated. Its connection with geology and anthropology is of immense importance, and it may safely be said that, but for the indications it has afforded, we should not have made the great progress in our knowledge of the earth, and our own genus, for the last few years.

We commend Mr. Fowler's excellent manual to all students of medical science. Indeed, there is none other equally suited to their wants within our knowledge.

The Transactions of the American Ophthalmological Society for 1869 are full of interesting matter to those specially engaged in this department of science. We can only make a very brief allusion to some of the more important papers. Dr. Knapp, now so well known in this country, contributes a mathematical article on the magnifying and diminishing power of convex and concave glasses as affecting visual acuteness. The conclusions he arrives at are that for glasses below No. 10 the magnifying or diminishing effect of the glass has but little influence on acuteness of vision. The results of his calculations for the effects of the lower numbers are comprised in a table.

[1] An Introduction to the Osteology of the Mammalia; being the Substance of the Course of Lectures delivered at the Royal College of Surgeons of England, in 1870. London: Macmillan & Co., 1870. 12mo, pp. 337.

A rare case of sarcoma of the iris is described by Dr. Roosa, of New York, interesting from its rarity, the more usual seat of this disease being in the choroid.

One of the most interesting papers in the Transactions is that of Dr. E. G. Loring, on relative accommodation in strabismus and insufficiency. Dr. Loring has given a great deal of careful study to this subject, and his paper will well repay perusal. Dr. Loring also describes a modification of the ophthalmoscope, which has since come into very general use among those much engaged in practising ophthalmology. Dr. Noyes, who is very fertile in the invention of new instruments, describes a modification of the same instrument, a new form of eye-speculum, and also a new form of cataract-knife. The blade is not so narrow as the usual Graefe's knife, has a straight back and convex cutting edge for one-half the distance from the point.

Dr. Agnew has a paper on a method of dressing eyes after cataract extraction. We have only mentioned a few of the many excellent papers presented to the Society, and have not attempted a review of any in so short a space. The volume will amply repay the careful reading, not only of specialists, but the profession generally. A short account of the second annual meeting of the Otological Society is added. This Society is increasing in interest and importance, and they have published their Transactions for the past year in a separate volume.

From the publishers, Messrs. John P. Morton & Co., of Louisville, Kentucky, we have received the two volumes of the *American Practitioner* for the year 1870. These volumes are handsomely bound and gotten up with much taste. The editorial labor which has been expended on this journal during the year has given the work a standard value, and rendered it one of the most attractive and readable journals now pubished in this country. The plan of the journal is quite like that of the English *Practitioner*, viz., to give especial prominence to therapeutical studies and applications, thus making it directly contributory to the practical every-day work of the physician. And, inasmuch as the materials presented are

gathered from every accessible source, there is presented on the part of the editors much solid, and, too often, unappreciated, labor in the way of condensation and abstract. We can, without flattery, say that Drs. Yandell and Parvin have done this work with great discretion and good judgment, and they have a journal which is creditable, not alone to themselves, but to the medical literature of the country. We wish them every success and encouragement.

The publication of the *Gazette Médicale de Strasbourg* was resumed on the 16th of November. We have received Nos. 18 and 19, of the date of September 25th and October 10th, published on the 10th of October, and Nos. 20 and 21, bearing date November 30th.

The *Baltimore Medical Bulletin* has been consolidated with the *Baltimore Medical Journal*, under the title of the *Baltimore Medical Journal and Bulletin.* The new publication will be conducted by Drs. Howard and Latimer, the former editors of the *Journal.*

Announcements of New Books.—By Henry C. Lea, of Philadelphia: A new edition of Eustace Smith's Wasting Diseases of Children. Diseases of Women, by Robert Barnes, M. D. Surgical Diseases of Children, by M. Guersant, translated by R. J. Dunglison. Blandford's Lectures on Insanity. Principles and Practice of Surgery, by J. H. Ashurst, Jr.

By J. B. Lippincott & Co.: Military Surgery, by G. A. Otis, M. D., Surgeon U. S. Army.

Books and Pamphlets received.—The General Principles of Organization, and the Evolution of Organic Forms. By Jerome Cochran, M. D. Pamphlet, pp. 53.

Report of the Board of the Cattle Commissioners presented to the General Assembly of the State of Rhode Island, January 27, 1871. By Edwin M. Snow, M. D. Pamphlet, pp. 15.

The Journal of the Gynæcological Society of Boston, vol. iii. Boston: James Campbell, 1870. 8vo, pp. 400.

Vaccination and its Protective Power in the State of West Virginia. By John C. Hupp, M. D. Pamphlet, pp. 12.

Bloodletting not necessary in the Treatment of Pneumonia. By D. W. Young, M. D. Pamphlet, pp. 25.

Miscellaneous and Scientific Notes.

PROF. GEORGE T. ELLIOT, M. D., whose death was announced in the last number of this JOURNAL, was born in New York City, May 11, 1827. He was a graduate of Columbia College, in the class of 1845, and received the degree of A. M. from the same institution in 1849. His medical studies were pursued under the instruction of the late Dr. Valentine Mott, at the University of New York, where he took the degree of M. D. in 1849. During his pupilage he served six months as an interne in the New York City Hospital, surgical side. Shortly after his graduation he went abroad, where he remained for three years, and during this time he was for six months, from July 11, 1849, resident interne at the Lying-in-Hospital of Dublin, under Dr. Shekelton, the then master of that institution. In January, 1850, he entered the Royal Maternity Charity, in Edinburgh, under Prof. Simpson, and the acquaintance, here begun as pupil and master, ripened into an intimacy which was unbroken up to the time of the latter's death in 1870. The high estimate in which Dr. Elliot was held by Sir James Simpson was constantly manifested in his letters, which are full of expressions of the warmest friendship and congratulations on the successful career of one whom he delighted to call "his professional son."

In the same year (1850) Dr. Elliot was for six months resident pupil on the Hospital-ship, Dreadnought, in London. After this he went to Paris, where he remained for eighteen months, attending various hospitals and pursuing his studies. Shortly after his return to this country he was made, in 1852, Resident Physician of the New York Lying-in-Asylum. This post he held for two years; and here it was that, by a very extensive practice, he perfected himself in that branch of medicine, operative midwifery, which was his favorite study, and in which he achieved so large a share of his professional eminence. In 1854, soon after commencing private practice, he was elected one of the attending physicians to Bellevue Hospital, which position he held up to the time of his death. This same year he was appointed Professor of Anatomy in the

Vermont Medical College, at Woodstock, but he occupied the chair only during one session. During this year he originated and was engaged in furthering the establishment of the Nursery and Child's Hospital of this city, and he continued to serve this institution in the capacity of attending and consulting physician up to his decease. For two years, 1858–'59, he was lecturer on Operative Midwifery at the College of Physicians and Surgeons in this city; and in 1861 he was one of the founders of the Bellevue Hospital Medical College, and continued through life his connection with this institution in the capacity of Professor of Obstetrics and Diseases of Women and Children, although prevented by illness from lecturing during the last session, 1870–'71.

At the time of his death Prof. Elliot was also the incumbent of many other professional positions of trust and importance, the chief of which were: President of the Medical Board of the Infants' Hospital, Consulting Surgeon to the New York State Woman's Hospital, Consulting Physician to the New York Asylum for Lying-in Women. Besides being a resident member of a number of our more important local societies, Dr. Elliot was a corresponding member of the Academy of Medical Sciences of Havana, of the Gynæcological Society of Boston, and honorary member of the Edinburgh Obstetrical Society.

From 1854 to 1860 Dr. Elliot was a frequent contributor to the medical journals of that period. Many of these papers were of great importance, and have acquired a standard reputation and authority. His principal work, however, was his "Obstetric Clinic," published in 1868. This book was in a measure a *résumé* of his previous papers, and contained, besides, a record of nearly two hundred important and difficult cases in midwifery, selected from his own practice. The plan of the work was simply to make a contribution out of his immense experience to the practical management of difficult obstetrical cases. It was not, therefore, adapted so much for the student as for the practitioner, and in this may be found an explanation of the fact that the work met with a more hearty reception, and received more solid encomiums, among the profession of Europe than here at home. Of late years the almost incessant demands upon his time prevented him from

contributing more freely to medical literature. To be enabled to do this was one of his favorite purposes, and he had long had in contemplation several works for which his immense experience and his scholarly acquirements peculiarly fitted him, and which he considered it his duty to give to the profession. The threatenings, however, of approaching ill-health, which came upon him about two years before his decease, compelled him to abandon this project, and devote himself, as far as consistent with his every-day work, to recuperating his strength. But the change was made too late, and availed him nothing toward accomplishing this result.

We purpose now no consideration of Dr. Elliot's character and professional worth. The brief remarks of Prof. Barker, published in another portion of this Journal, are a faithful reflex of the opinions of those who knew him; while the almost universal sorrow that came upon the profession, and upon his extended circle of acquaintances, both at the time of his first attack of apoplexy and at his death, indicates only too clearly how high was the estimate put upon him, and how deep and overwhelming the sorrow at the loss of one who stood confessedly among the leading practitioners of this city and country.

We are indebted to the kindness of Prof. Austin Flint, Sr., who attended Dr. Elliot in his last illness, for the following account of his case:

February 17, 1871.

Dr. Dunster—Dear Sir: In compliance with your request, I send you the following brief account of the case of my late lamented colleague, Prof. George T. Elliot.

Yours very truly,

A. Flint.

The first manifestation of the disease which led to the fatal apoplectic seizure, namely, atheromatous disease of the cerebral arteries, was in the winter of 1868–'69. On arising in the morning, he found that vision in one eye was lost. This occurred without any antecedent or accompanying symptoms showing disease of the eye. He consulted Prof. Henry D. Noyes, who, by means of the ophthalmoscope, found that hæmorrhage had taken place into the retina. He discontinued

study, and, as far as practicable, rested from his mental labors. In a short time the vision returned.

In the early part of the summer of 1869, he was much jaded from the mental strain and labor incident to his large practice, and, after a short respite at Saratoga Springs, without much benefit, he took a vacation of about two months, making in this time an excursion to Europe, returning in September.

During the winter of 1869–'70, he seemed in good health. He lectured at the college and hospital three or four times a week during the session, lasting from the middle of September to March, and he did not spare himself in the duties of practice. But in April, 1870, complaining again of being jaded, he took a vacation of several weeks at Saratoga, and at his country house at Garrison's, on the Hudson. He returned to the city in May, and apparently was quite well, entering with his usual zeal into his professional labors.

The second manifestation of his disease was on June 26, 1870. He had then an attack of hemiplegia, occurring under the following circumstances: For the week preceding he had seemed unusually well, and was in fine spirits. During the night preceding the 26th of June, his former associate, Dr. Foster Swift, had a case of labor during which thrombus in the labia occurred. At 5 P. M. Dr. Swift called upon him to consult in relation to the case. He received Dr. Swift cheerfully and entered fully into the consideration of the case. During the interview, however, he was nauseated, and twice made efforts to vomit. On inquiry as to his health, he made light of the gastric disorder. Shortly afterward, on visiting the patient, Dr. Swift became anxious, and sent for Dr. Elliot in consultation. He came promptly, and at once proceeded to make an incision into the labia, removing clots of blood and introducing lint saturated with a styptic. Dr. Swift noticed that his manner was rather abrupt and rough. The hæmorrhage not being arrested, Dr. Elliot was again desired to come, and Prof. T. G. Thomas was also called in consultation. This was 9 o'clock A. M. At this meeting Dr. Elliot exhibited considerable irritability, which was the more noticed because it was so foreign to his usual manner. It was decided to resort to the hot iron, and this was done by Dr. Elliot. The condition of the patient

was very alarming. Soon after this operation, Dr. Elliot, who was sitting near the bed of the patient, complained of faintness, and, with a voluntary effort, lay upon the floor, a pillow being placed under his head. Shortly he said, "I shall have an attack of hemiplegia." He requested Drs. Thomas and Swift to assist him to another room. In doing so they were obliged to remove him by their own efforts, although at this time he was able to move the limbs to which he referred the paralysis. In a few moments he called Dr. Swift to him, and now it was evident that there was hemiplegia. He spoke with much difficulty and the loss of power over the right upper and lower limb was complete. His intellect was intact, and he at once gave to Dr. Swift an affectionate message to be delivered to his family, if he became unable to communicate with them. Soon it became impossible to understand him.[1] He was removed to his house, and, in a short time, he was seen by Dr. Hammond in conjunction with Drs. Thomas and Swift. Being absent from town, I did not see him until the evening of June 27th. There were associated then in consultation Drs. Thomas, Swift, Hammond, Van Buren, Geo. A. Peters, and C. C. Lee. He was subsequently seen by Dr. Metcalfe and several other medical friends.

With this attack there was at no time loss of consciousness, nor were the mental faculties materially affected. For three days he seemed much of the time morbidly dull and somnolent; as he afterward assured me, however, he appreciated fully his situation, and was cognizant of every thing, but he did not manifest more intelligence, because he wished to be let alone. Up to the fourth day of the attack, he felt that he should die, but on the fourth day he appeared better, and said he thought he should recover. The treatment consisted simply of enemas, and cold applications to the head, the nourishment being milk and beef-tea. I may state here that there was unanimity of opinion among those who were associated in consultation, in attributing the attack to an extravasation into the motor tract of the left hemisphere. This opinion was based on the suddenness of the attack, the completeness of the paralysis, the absence of any definite antecedent cerebral symptoms, the

[1] These details were given to me by Dr. Swift, and noted at the time.

development of fever, as denoted by the pulse and axillary temperature, continuing for three days and then ceasing, the fact that ecchymosis in the retina had occurred, the absence of valvular lesions of the heart, and also the exclusion of disease of the kidneys.

From the fourth day after the attack, the improvement on each day, for some time, was marked. He regained his appetite and digestion. His mental characteristics returned. Soon he began to recover power over the lower limb, and the beginning of voluntary movements in the upper limb speedily followed. The distortion of the face, when the facial muscles were moved, which was at first considerable, diminished, and in a short time nearly disappeared. His articulation rapidly improved, and in a short time he enunciated with distinctness. There was no aphasia. Friction and shampooing of the paralyzed limbs were employed shortly after the improvement began, and subsequently electricity was applied under the direction of Drs. Beard and Rockwell. These measures, together with strychnia in small doses, a carefully-regulated diet, mental repose, and exercise within the limit of fatigue, constituted the treatment up to the occurrence of the fatal attack.

After a few weeks, the improvement as regards the paralysis was slow, but it was steadily progressive. In the early part of August he began to walk with the aid of a cane. He passed several weeks in this month and in September at Staten Island, and in the middle of September went to Garrison's, where he remained until shortly before Christmas. He was able, before he left Garrison's, to walk several miles daily, and he acquired more and more power over the upper limb. There was no evidence of any impairment of his mental faculties. With regard to this fact, all his friends were satisfied. Although admitting the occurrence of a small extravasation, he cherished a strong conviction that his recovery would ultimately be complete; and in returning to the city, about Christmas, he felt that he might safely enter somewhat into the excitement of seeing his friends more than was practicable in the country.

The fatal attack was on the 28th of January. He had continued to improve after his return to the city. He saw his

friends freely, and even engaged a little in office practice. He came to the conclusion, however, that it would be wise to leave the city for a year, and devote himself exclusively to his recovery. On the day of the fatal attack, and the preceding day, he was in unusually fine spirits. The attack was at 9½ P. M. He had enjoyed in the evening the society of his family, and played with much zest several games at draughts, when he said he felt fatigued, and retired to bed at his usual hour of retiring. A few moments afterward, his noisy respiration attracted attention, and it was at first supposed that he was feigning in jest to be asleep. He was found to be comatose. Dr. Geo. A. Peters was with him in from five to ten minutes after the attack, and Dr. Hammond and myself were at his bedside in less than half an hour. The coma was complete. For about two hours he had, at intervals of from five to ten minutes, paroxysms of breathing with a convulsive noisy expiration, the sound denoting paralysis of the vocal chords. During these paroxysms there were clonic convulsive movements of the extensors of the upper limbs, with pronation of the thumbs, and at times forcible tremor, especially of the lower limbs. Occasionally there was slight opisthotonos. During these paroxysms the pulse became 160 per minute, and it fell to 100 in the intervals. The paroxysms lasted four or five minutes. After the lapse of about two hours they ceased, and the breathing became stertorous, with puffing of the lips on expiration, and contraction of the alæ nasi during inspiration. Death took place at 3 A. M., January 29th.

The autopsy was made thirty-six hours after death, by Prof. William T. Lusk, M. D., in the presence of Drs. Hammond, Van Buren, Geo. A. Peters, Lee, Lente, Rockwell, and Flint. The examination was limited to the head. The report by Dr. Lusk, of the appearances, is as follows:

Post-mortem Appearances of the Brain of Dr. Geo. T. Elliot.

The sinuses of the dura mater and the vessels of the brain were distended with blood.

The convexities of the hemispheres were covered with prominences, the largest of them the size of a pea. These

proved, on tearing off the adherent dura mater, to be due to unusually large Pacchionian granulations.

A flattened cyst, size of the kernel of a large almond, and filled with dark-colored connective tissue, was found in the posterior part of the left corpus striatum. The cyst contained a few drops of fluid resembling pus.

Into the right ventricle an extensive effusion of blood had taken place, causing a breaking down of the contiguous tissues, so that the corpus striatum and the optic thalamus were no longer distinguishable. In this way a cavity the size of a large orange was formed, filled with coagulated blood. The hæmorrhage likewise broke through the septum, passed to the left ventricle, and downward to the fourth ventricle. Small extravasations were noticed in the crura cerebri.

The arteries of the brain were atheromatous, presenting the usual appearances; yellowish-white opaque striæ, showing increase of connective tissue, fatty detritus, and fatty metamorphosis of cells.

BELLEVUE HOSPITAL, *February* 1, 1871.

The committee appointed to prepare resolutions expressive of the sentiments of the members of the Medical Board of Bellevue Hospital, on the occasion of the death of our associate, the late Dr. George T. Elliot, submit the following:

Resolved, That, in the death of our honored and beloved associate, we have to deplore one who was justly distinguished as a learned, skilful, and accomplished physician, who exemplified an irreproachable life, and the virtues of a good citizen; who in his social relations was eminently refined, genial, and brilliant, and who was a sincere, devoted, and reliable friend. Removed from us at an age when many more years of active usefulness were to be hoped for, all who have been associated with him will ever hold in cherished remembrance his superior mental endowments, his varied attainments, and the still higher moral qualities which rendered him not less endeared than admired.

Resolved, That as members of this Board we mourn the loss of a colleague whose counsel and efficient aid in furtherance of the cherished objects of Bellevue Hospital, and in behalf of medical education, have been invaluable; and that, as a slight testimonial of the respect of the Board for his memory, a portrait or bust be procured to remain permanently in the room in which the meetings of the Board are held.

Resolved, That we tender to the family and relatives our heart-felt sym-

pathy in the bereavement with which an all-wise and beneficent Providence has seen fit to afflict them.

ISAAC E. TAYLOR, M. D., *President.*

A. FLINT, JR., M. D., *Secretary.*

At a meeting of the Faculty of Bellevue Hospital Medical College, the following action was taken in reference to the death of Prof. Elliot:

Resolved, That, in the death of Dr. George T. Elliot, the Faculty of the College have to deplore the loss of one of the founders of the institution; one who has been connected with it from its inception, and who, by the brilliancy and variety of his talents and attainments, was a main agent in promoting its success and usefulness.

Resolved, That we tender our heart-felt sympathies to the family of our late colleague for the loss of one who was endeared to all by his kindly nature and social qualities, as much as he was respected for his spotless integrity and his high professional skill and acquirements.

B. W. MCCREADY,
AUSTIN FLINT,
A. FLINT, JR., } *Committee.*

At a stated meeting of the New York Academy of Medicine, held February 2, 1871, the following resolutions were unanimously adopted:

Whereas, It has pleased Almighty God in His infinite wisdom to remove from us our fellow-member, George T. Elliot, M. D.: therefore be it

Resolved, That while we bow in submission to the Divine will, we deeply deplore our loss.

Resolved, That, in the death of our lamented associate, we recognize the loss of one whose brilliant talents, high moral character, sterling worth, and scientific attainments, rendered him an ornament to his profession and to this Society.

Resolved, That we deeply sympathize with the relatives of our deceased brother in their irreparable loss and great affliction.

Resolved, That a copy of these resolutions be published in the medical journals of this city, and a copy be transmitted to the family of the deceased.

E. R. PEASLEE, M. D., *President.*

W. T. WHITE, M. D., *Secretary.*

Action of the Board of Commissioners of Public Charities and Corrections on the death of Dr. George T. Elliot.

Resolved, That this Board has learned with profound sorrow the death

of Dr. George T. Elliot, President of the Medical Board of Infants' Hospital, and member of the Medical Board of Bellevue Hospital of this Department. Cut off in the midst of his usefulness and in the pride of manhood, conspicuous for his professional skill, for his varied learning, and for mental ability, his loss is to be deplored as a great public calamity.

Resolved, That a copy of the foregoing resolution be respectfully forwarded to the family of the deceased.

Action of the Medical Board of the Nursery and Child's Hospital.

Resolved, That the Medical Board of the Nursery and Child's Hospital have heard with deep sorrow of the death of Dr. George T. Elliot, who, as a member of the staff from the foundation of the institution, a period of seventeen years, first as Attending, and subsequently as Consulting Physician, contributed so much to its welfare and prosperity.

Resolved, That we, his former colleagues, hereby record our high appreciation of the valuable and efficient services which he so generously gave to the Hospital and to us at all times, our admiration of his splendid talents, his great practical skill, and his powerful influence in this and similar institutions.

Resolved, That we ever cherish the memory of our late esteemed associate, and tender to his bereaved family our warmest sympathy in their great loss.

T. M. Markoe, M. D.,
J. J. Hull, M. D., } *Committee.*

New York, *February* 15, 1871.

Dr. John Rhea Barton, who some thirty years ago occupied a foremost place among the eminent surgeons of Philadelphia and of the United States, died in that city, on January 1st, in his seventy-seventh year. He graduated at the University of Pennsylvania in the class of 1818, in which were Drs. Hugh L. Hodge and George B. Wood. He was a very brilliant operator.

We record with much regret the death of Dr. Edward Rhoads, of Philadelphia, on the 15th of January, aged twenty-nine years. Though the professional career of this young physician was short, it was marked from the outset. Dr. Rhoads was one of the physicians of the Philadelphia Hospital, a lecturer in the medical department of the University, and editor of the *Medical Times*, though from failing health he had never entered upon the active duties of management. His force and

purity of character were as marked as his mental capacity and high culture. His brain was large and well formed, and weighed fifty-seven and a half ounces.

Homœopathy, Allopathy, and Expectant Medicine, in the Eighteenth Century.—In the beginning of the last century there flourished, at Halle, a learned medical scholar by the name of Michael Albertus. Michael taught the practice of medicine in the University of Halle with *éclat* unbounded. An industrious man, he left no less than three hundred and eighty-five essays behind him, not one possibly with a single poor fact; yet all influencing his days, and the days that came, and even the days that are. Full of speculative fancy leading to nothing and wanting utterly in experimental foundation, our learned Michael took it into his head to divide the process of curing into three great branches, and he was good enough to devote a special essay to the elucidation of each branch. His first essay he named "De Curatione per Contraria;" his second, "De Curatione per Similia;" his third, "De Curatione per Expectationem."

The dogma enunciated in the first of these essays, because it seems to cover the largest view of curative medicine, has been the most orthodox, and, in distinction of it, the term allopathy has been applied. The dogma enunciated in the second of these essays, "De Curatione per Similia," seized upon by another wilder and more concentrate dogmatist than the master, I mean Hahnemann, has been converted into a pretended all-curative system, under the name of homœopathy. The third of these essays, "De Curatione per Expectationem," seized on by the other concentrate dogmatists, has also been converted into a pretended all-curative system under the name of the expectant treatment, and has been the delightful resort and resource of all the timid skeptics for many generations. In fine, these three divisions of so-called curative medicine remain as actual systems to the present hour; absolute systems for men to live and practise by; and yet all gross and imbecile assumptions, each a curse-blighting science, and saying to medicine: "You may be a practice, a system, a school, but a true science you shall not be.". . .

Michael Albertus, well-meaning and innocent scholar, is a good mark of scholars in those days for us to avoid. I set him up to knock him down as a public danger, and I would like to bury him and all like him, lest any should stumble over him or them when down. . . . The time lost, the intellect lost, and the money lost, and in and by all these losses the lives lost by constructive opposition to true progress, are incalcula-

ble, and the moral to be learned from the history is, that dogmas in medicine ought from henceforth to be allowed no moment of life; but that every step of advancement in curing disease must be a single step, proved by its own excellence, based on its own merit. It must be like a chemical experiment, the details of which are known and are susceptible of being tested and demonstrated by every competent practitioner.—*Dr. B. W. Richardson's Address, "The Science of Cure," delivered at the Anniversary Session of St. Andrew's Medical Graduates' Association*, 1869.

At the recent meeting of the State Medical Association, the Merritt H. Cash prize was awarded to Dr. S. Fleet Speir, of Brooklyn, for the essay upon "The Artery Constrictor," designed for the instantaneous hermetic closing of arteries without the use of ligatures or other foreign substance to be left in the wound.

A New Parasite.—Dr. Cobbold, in a late number of the *British Medical Journal*, describes an entozoon, hardly known to helminthologists, the *Stephanurus dentatus*, a species of Strongylus. A specimen was forwarded to him for examination by Dr. Fletcher, of Indianapolis, Indiana, who states that it is found in the hogs slaughtered in the Western States.

Death from the Effects of Sulphuric Ether.—In the *Boston Medical and Surgical Journal* for December 8, 1870, Dr. Walter Burnham, of Lowell, records a case of this sort, which happened eight years ago. Our readers well know our opinions of the comparative danger of the two anæsthetics, ether and chloroform. We therefore print this case in full, suspending judgment thereon, lest we may be charged with unfairness or wrong interpretation of facts. Accepting the case as it stands, it in no way alters the opinions we have so repeatedly enunciated on this important subject:

In the autumn of 1862, after a severe skirmish, I was directed by a regimental surgeon, who was my superior officer, to administer sulphuric ether to one of his men, who had been wounded on the previous day, for the purpose of an amputation of the thigh just above the knee.

The wound was produced by a minié ball from the rifle of a sharp-shooter, hid in the top of a tree. The soldier, at the

time, was mounted and his foot was in the stirrup, with his knee bent upon the thigh. The ball struck him just above the patella, and passed through the condyles and out at the popliteal space, dividing the blood-vessels and nerve.

The assistant surgeon, who stood almost at his side, at once filled the wound with persulphate of iron and lint, and secured it with a tight bandage. The hæmorrhage ceased immediately, so that the bandage was scarcely stained. The patient was then taken directly to the regimental hospital, about one mile distant, where he had good care till the next morning; he was then placed upon the operating-table in order to have his limb amputated.

He was a stout-built German, and could not speak English, so I could not converse with him; but he was reported to have rested well during the night with a single Dover's powder; his countenance looked well, his pulse was full and strong, not above 80 per minute. He had no symptoms which indicated exhaustion or severe shock from the wound.

I have been thus particular in my description of him, that the profession may judge correctly of the cause of his death. I should also remark that his heart was observed to act with great uniformity and strength during the whole night, and that he slept more than is common after such injuries. It was also noted that he had no symptoms of shock to the nervous system. Indeed, no fears were entertained of the slightest danger when he was brought into the operating-room.

After the usual preparation for operating, I commenced giving him sulphuric ether (under a protest as to my preference, for I always use chloroform) with the same care and precaution which I always exercise in the use of chloroform, to wit: I placed a small napkin in a bowl to cover the face, and held it so that it could not touch the face or mouth, and poured about an ounce of ether upon the napkin, adding one or two drachms of ether every two or three minutes. It required, in my judgment, about ten minutes to render him entirely insensible, which corresponded with his respiration and pulse. I then said to the surgeon that he was ready for the operation, and at the same time removed the bowl from his face. The tourniquet, which had previously been loosely applied, was then tightened; at the same time the patient appeared to be recovering from his state of anæsthesia, and the surgeon manifested some impatience that I had not continued to keep it to his face, declaring that there was no danger from the ether. But it required only a few seconds to restore complete anæsthesia, and the operation was at once commenced. I again removed the ether from his face, which the surgeon noticed, and impatiently ordered me to renew it. I reapplied the napkin, with a drachm

of ether freshly poured upon it. After one or two inspirations, the patient ceased to breathe, and I raised the napkin from his face. The surgeon reproved me for not *obeying his orders*, and again ordered me to "crowd the ether." I told him the man was not breathing well; but this increased his impatience. I told my superior I would give *ether* if he would make the man *breathe*, but that he was *dead*. He then, after I had stepped back, saw that I was correct, and softened down and said, "Doctor, you are right."

The surgeon had not applied the saw nor finished the use of the knife when death took place. There was no hæmorrhage, nor any other apparent reason for his death; but very soon after he began to inhale the ether his pulse was noticed to grow feeble by Dr. Bancroft, who was with me and called my attention to it; but the patient died so soon after, I did not examine the pulse afterward.

The surgeon, believing that sulphuric ether could not produce death, was unwilling to admit that it was due to that cause in this case; yet he said he "he did not see what else caused it," for he had seen no signs of any thing like shock since the patient came into the hospital.

I have had a very large experience in the use of anæsthetics, but mostly with chloroform, and have seen many cases of suspended animation from both articles, and have used more than one hundred pounds of chloroform; but this is the only case of fatal termination that I have ever witnessed. Yet I cannot perceive that there was any other cause connected with this death than the effects of ether. And this was owing, in my opinion, to an idiosyncrasy which could not previously have been discovered. With the experience which I have had, ever since the use of anæsthetics, I cannot be charged in this case with being careless or overdosing.

Increase in the Mortality during the Siege of Paris.—The usual weekly bulletin of deaths shows the number to be between 1,000 and 1,200. In the last weeks of the siege it rose to 3,000 and over. This was not due to the prevalence of any epidemic, but to the scarcity of food and fuel, which told heavily on old persons, invalids, and children. Moral causes, too, had their effect. Lung-diseases were very common and mortal among those advanced in years.

Death from the Use of Chloroform in Dental Practice.—The following is copied from the *Dental Register* of Cincinnati, and is addressed to the editor of that periodical by Dr. E. C. Ham-

ilton, of Washington C. H., Fayette County, O., under date of October 5, 1870:

"Dear Doctor: Another victim to chloroform paid the penalty in my office on Thursday last.

"Mrs. Garis, the wife of our county sheriff, came to my office on Thursday afternoon for the purpose of having three roots and one molar tooth extracted. Dr. I. G. Wilson, a physician of this place, was with her, to administer chloroform. After I examined the mouth, and laid out the necessary forceps for the operation, Dr. Wilson proceeded with the chloroform, and after administering probably ten minutes [minims?] (he did not intend to put her entirely under its influence), he called to me to take out one tooth. I then extracted the root of the right superior lateral incisor, only about one-fourth of an inch in length, and attended with no difficulty whatever. The patient then asked for more chloroform, and the doctor was on the point of giving it, when death ensued. Three physicians worked probably three hours to restore life, but all in vain.

"These are the facts of the case. Three of our medical gentlemen, who use chloroform extensively, attempted to charge upon 'the shock of extraction' as the cause of death, but the people so ridiculed the idea that they abandoned it. Of course all who are acquainted with the facts attach no blame or responsibility upon me, as it is well known that I have invariably refused to use chloroform, and have advised in every case against its use in dental surgery.

"I make this statement to you so that you may know what the facts are, and not be misled by newspaper statements, in case you desire to refer to the case in the *Dental Register*."—*Boston Medical and Surgical Journal.*

Deaths from Chloroform.—The *Boston Medical and Surgical Journal* copies the following from the *Hartford Evening Post:*

"Chloroform was given in this case to allow the reduction of a dislocated humerus. Before administering it, the surgeon carefully examined the heart and lungs, and found them apparently free from disease. The testimony of physicians present is that he used more than ordinary caution.

"Dr. —— himself stated, in answer to inquiries, that the reason why he exercised his unusual caution in giving the chloroform was because of Mr. ——'s habits as to the use of alcoholic stimulants, whereby his constitution was impaired.

Dr. —— also stated, in answer as to what he considered the the cause of death, that he thought that the chloroform was the immediate or exciting cause, but that death would not instantly have occurred without a predisposing cause, such as some disease of the heart or other vital organs, which could not have been detected. He also answered that deaths from chloroform were of more or less frequent occurrence, and that even this year, Dr. Simpson, *the discoverer of chloroform* [the italics are ours], had a patient die, to whom he himself was administering it, and that it had repeatedly happened in the hands of the most eminent surgeons."

In the Cincinnati Academy of Medicine meetings, of October 17 and 24, 1870, the case which occurred in the practice of Dr. W. W. Dawson (see this JOURNAL, February, 1871) was reported in detail. In the discussion which followed, Dr. Dawson reported three other cases which occurred in that city:

The first was a lady in the office of Drs. Meredith and Sexton, dentists. This occurred in 1848.

The second occurred in the practice of Dr. Krause, an oculist of this city, in 1860.

The third in the Cincinnati Hospital, in a patient of Dr. T. Wood, being operated on for fistula in ano.

The present, the fourth, is the fourth in Cincinnati since 1848, the period of its (chloroform) introduction here.

He then mentioned the details of some five or six other unpublished cases, of which he had a knowledge, all having occurred in the immediate vicinity of Cincinnati. Dr. Ludlow referred to an additional case in the practice of Dr. Blackman; and Dr. Stewart, of Fayette County, Ohio, reported still another.

The report from which we gather these items is so indefinite that it is impossible to say how many of these cases have been hitherto unpublished, but we are safe in assuming that at least seven of the number are new.

Note to Article on Gastric and Intestinal Tubules.—My friend Dr. Edward G. Janeway, after the foregoing paper[1] was in

[1] This note was received too late for insertion at the proper place, page 280.—ED.

type, kindly furnished me with a translation of an extract from a work, by a German author, Klebs, on pathological anatomy, containing an account of morbid changes in the gastric tubules. The account of the changes given by this author corresponds, in all material points, with the descriptions by Drs. Jones, Fox, and Fenwick.

He considers "parenchymatous clouding" of the stomach-glands (gastritis, glandulosis, gastradenitis) as of frequent occurrence in all severe acute diseases; the early and intense disturbances of digestion which accompany febrile complaints being thus explained. He describes with considerable minuteness the microscopical appearances which the glands present in the different stages of scarlet fever. Fatty degeneration of the cells, and molecular destruction, he describes as especially found in cases of poisoning in which life is destroyed slowly. The most marked fatty degeneration occurs in phosphorus-poisoning. A striking analogy to these cases is presented by the appearances in small-pox. Next to phosphorus-poisoning and small-pox, puerperal fever and typhus offer the greatest amount of degenerative changes. Lesser grades occur in all febrile and infectious diseases. The secretion of the mucous membrane diminishes, as shown by dryness of the membrane, in proportion to the amount of these changes. Protracted convalescence may be explained by the slowness with which these changes are recovered from.

In cases of chronic gastritis (latent), a deposit of pigmentary granules takes place in both the glands and the interstitial tissue, especially at the pyloric portion of the stomach. The glandular cells are often small and without granular contents, as a result of hypertrophy of the interstitial tissue. Cysts are formed by closure of the ducts of the glands.

The author also gives an account of warty growths (mammillations), which he thinks may be due either to actual hypertrophy, or to atrophy causing the non-atrophied portions to be relatively prominent.

I have given this condensed abstract of the full translation, which embraces an account of morbid appearances in the mucous membrane, aside from those relating to the gastric tubules. AUSTIN FLINT, M. D.

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ART. I.—*Anæsthetics.* By EDWARD R. SQUIBB, M. D., Brooklyn, N. Y.

TIME, that tries all things, has disposed of many of the issues which arose in the early application of anæsthesia, but has entirely failed in producing that universally applicable anæsthetic—that philosopher's stone for which the alchemists of the profession still vainly search—namely, an agent which shall be potent, but potent only for good. This physical impossibility seems to be to the medical profession what perpetual motion is to mechanics, and time wears away such heresies very slowly. It would, doubtless, be better for the profession and for mankind if the anæsthetics already known were better studied in relation to their special adaptations, and were applied with a more wise discrimination.

The condition of perfect anæsthesia is one of the most grave and frightful conditions of life, and by suspending more than half of vitality it comes so near to death that it is wonderful to reflect how near that boundary-line can be approached and yet be so rarely passed. Familiarity with anæsthesia, and a mere distant view of its accidents, lead the profession to plunge their patients into it with too much reck-

lessness. This condition, now so familiar to all, when seen but a few years ago, never failed to excite the gravest apprehension; and even now, when seen as the effect of other narcotic poisons, causes much anxiety and secures the most active measures for relief.

So much does it become a matter of personal or local habit or practice to use one or other anæsthetic exclusively, regardless of risks or warnings, and to defend this exclusive practice against all who doubt its wisdom, that each little circle in the profession, or each man, requires, as in the instance of this writer, some grave accident to awaken a sense of proper responsibility, and teach the wisdom of discrimination.

The roughly-expressed though perhaps practical condition essential to anæsthesia, is diminished oxidation in the sensorium; and the primary object is, to confine this within the limits of safety. It is a kind of partial suffocation or asphyxia occurring not in the organs of respiration and circulation primarily, but far back of these in the tissues where the vital act of oxidation occurs. The air-passages normally admit oxygen, and the blood takes it up and carries it, but carries with it an agent which prevents its assimilation in the tissues which preside over vitality. To diminish this assimilation seems to constitute anæsthesia. To prevent it is death by narcosis. Hence the only line of safety in practice, in the present state of knowledge, is to regard the difference between anæsthesia and death as a difference in degree or quantity only. The condition may be partial, full, profound, or fatal, but with no distinct boundary-lines between the degrees. The two intermediate degrees constitute anæsthesia proper, and the first of these is desired in medicine and surgery. In the production of this anæsthesia the more powerful, prompt, and efficient the agent, and the more impressible the individual organization upon which it acts, the greater the liability to overleap the intermediate stages or degrees, and unexpectedly extinguish life. This seems but common-sense, and physicians are familiar with the principle in the toxic influence of all acute diseases, though they often fail to apply it in this most acute of all diseased conditions wherein the issues of life and death are narrowed down, not to a few hours, but within a few minutes.

Add to this the fact that this condition rests with the physician whether to produce it or not, and it is difficult to understand how its importance can be over-estimated.

The agents commonly used to produce anæsthesia, and now called anæsthetics, were formerly all classed as diffusible stimulants, because, in studying them, writers had not gone beyond their prominent primary effect. Now, however, this stimulation is regarded as the first of four degrees or stages into which their total effects may be usefully divided; and it is remarkable that the first and last of these stages are in such absolute antagonism that, studied separately and independent of a known cause, the agent producing the one would naturally suggest itself as an antidote to the other. The most important relations between these agents and the different degrees or stages of their effects, are quantity and potency or inherent strength; and these are again but relative to the susceptibility upon which they act. A fluidounce of alcohol would stimulate an adult, and four fluidounces would narcotize him, but with distinct intermediate stages. The same quantities of the same agent would destroy an infant by narcotism, without any distinct intermediate stages from either dose. One-eighth of these quantities of chloroform would produce similar results from its inherent potency, in one-eighth of the time, and the rapidity of its action would amount to suddenness, and hence to the obliteration of intermediate stages. The more potent the agent the shorter is its course, and the fewer and less distinct the intermediate steps by which the ultimate result is reached. Add to this the circumstance that this potency involves the risk of incidental or accidental complications which tend to precipitate the normal calculated results.

Narcosis is progressive, and may advance symmetrically or asymmetrically. That is, all the vital functions may be equally and uniformly depressed to obliteration; or, the narcotic influence may, in any part of its progress, be concentrated upon some one vital function or organ, and thus interrupt the progress by a short-cut to the end.

All this is intended to exhibit anæsthesia as a stage more than midway in a pathological course, the natural terminus

of which is extinction of life; and that to produce and maintain this stage of narcosis with safety is a very delicate question of the application of means to an end, the grave importance of which is too often disregarded upon insufficient grounds. The accomplishment of any given amount of work with the utmost promptitude and certainty renders an excess of power necessary, and the greater this excess of power the more difficult it is to control the power with safety to the work. This just relation between the work to be done and the power which is applied to do it, involves the whole question of choosing an anæsthetic, and equally forbids the arbitrary or habitual use or exclusion of either of the well-known and well-tried agents, while it imposes a grave responsibility, first in the selection, and then in the application, of the special agent selected.

Dr. Augustus Waller, of Geneva (see *The Practitioner* for December, 1870), proposes compression of the pneumogastric nerves in the neck as a safe way of procuring temporary anæsthesia in some cases. Should any such mechanical means as this ever be found practically successful, even in a small proportion of cases, it would be a great gain for minor surgery.

The anæsthetics that have been well tried up to the present time are three in number; and, with proper discrimination in applying each of these to its appropriate uses only, and proper skill in using each, all the legitimate purposes of anæsthesia can be well accomplished with reasonable safety. These three anæsthetics are nitrous oxide, ether, and chloroform; and they are all in extensive daily use in this country at this time.

It happened, however, that, after the application of chloroform to anæsthesia by Sir James Y. Simpson, of Edinburgh, the tide of popular favor ran so strongly in favor of this anæsthetic that it rapidly took the place of all others, while anæsthesia was yet a novelty. Hence by far the largest proportion of the experience in anæsthesia has accumulated from the use of this agent. Within the past two years there has been a reaction in this country in favor of the safer anæsthetics, and it is the primary and almost the only object of this paper to favor this reaction which now tends to give to each anæsthetic its proper place in anæsthesia. At one time chloroform was

almost as exclusively used in this country as in Great Britain. Now, however, it is probably used in more than half the cases, or at least as often as all other anæsthetics together. Various mixtures of chloroform and alcohol, and chloroform and ether, may be used in a twentieth part of the total cases, and nitrous oxide in another twentieth, while ether alone may be used in four-tenths of the total cases. These proportions should be, and probably will ultimately be, so far reversed that ether will be used in six-tenths of the cases, nitrous oxide in three-tenths, and chloroform in one-tenth of the cases to which these three agents are applied.

Nitrous oxide was the first anæsthetic; and the safety and certainty of its effects, even in inexperienced hands, for all momentary operations, and the promptness with which persons recover from its use, render it perhaps the most important of all anæsthetics, because destined to relieve a greater aggregate amount of pain with greater safety than any other agent.

Its practical application to dental surgery by Horace Wells, of Hartford, Connecticut, in December, 1844, was the commencement of anæsthesia; and hence, in the opinion of this writer, Horace Wells is in every good practical sense the discoverer of anæsthesia, and deserves both the honor and the reward.

Upon the general principles above mentioned it is very certain that any agent capable of producing anæsthesia is capable of causing death, and is therefore dangerous; and nitrous oxide has doubtless caused death by its primary influence. But this is so very rare in the many thousands of cases in which it has been used that its record of comparative safety is practically complete. The dental profession deserve the credit of all that has been done in the way of utilizing the advantages of nitrous oxide. After the reverses of Horace Wells, it was not until the notoriety and fashion of using ether and chloroform had worn off the novelty through many years that the use of nitrous oxide began to revive; and yet, in the short time during which it has now been popularly used in this country, the number of administrations have so rapidly increased that they can now hardly be less than twenty thousand per annum, but may be much greater, and this almost exclusively in dental

surgery. It is quite time that the medical profession should awake to the practical advantages and applicability of nitrous oxide to the momentary operations of minor surgery. These operations so far outnumber the greater ones that they outweigh them in the aggregate amount of pain involved; and, if the surgeon considers the safety and saving of pain to his patient first, and his own convenience in operating second, he will hesitate before passing over such an agent as nitrous oxide.

It does not appear to be well adapted to any other than momentary operations, chiefly because, to obtain complete anæsthesia from its use, it must be breathed nearly or quite pure, and therefore entirely cuts off the air-supply, and arrests the vital process of oxidation or aëration of blood in the lungs. Under these circumstances, when the store of oxygen which the blood contained at the commencement of the inhalation is exhausted, death must supervene. This being rather a negative than a toxic influence, however, the readmission of air to the lungs very speedily corrects it, provided the narcosis has not progressed so far as to arrest the mechanical movements of respiration or circulation. A patient may doubtless be as effectually drowned by nitrous oxide as by water, and the resuscitation from partial drowning by it involves the same principles of treatment.

The great obstacles to the more general application of nitrous oxide as an anæsthetic are the inconveniences, rather than difficulties, of obtaining, keeping, and administering it; but now under its rapidly-increasing use these obstacles are as rapidly being overcome. If but half the intelligent pains and labor had been expended upon it that have been given to carbonic acid or soda-water, its advantages to mankind would have been better appreciated.

In England the gas is liquefied by cold and compression, and is offered for sale in small iron bottles arranged with stopcock, etc., so that the gas is liberated simply by relieving the pressure in the bottle of liquid. The gas is received in bags of india-rubber as wanted, and is administered from these. The enormous pressure of fifty or sixty atmospheres, or about eight or nine hundred pounds to the square inch, is required

to keep it in the liquid state, and this renders it doubtful whether any such plan of using it can ever become generally applicable. Some plan by which it may be held in solution, or be compressed and held under a pressure of say one or two atmospheres, would be much more practical, and will sooner or later be accomplished.

The original apparatus for making and keeping the gas has now, however, been so simplified and so cheapened by the dental profession as to be managed by the most ordinary intelligence. The entire apparatus for making and keeping the gas in quantities of forty and fifty gallons is now sold at the depots for dental supplies at a cost of from forty-five to seventy-five dollars in proportion to the degree of ornamentation, and one pound of nitrate of ammonia, costing about fifty cents, yields from twenty-five to thirty gallons of the gas. An average of about seven gallons of gas is required for complete anæsthesia, and from one to two minutes is commonly necessary to effect this. The anæsthesia is of about one to one and a half minute in duration, and passes off almost entirely in three or four minutes.

It is hardly too much to say that every hospital and dispensary throughout the country should be supplied with this apparatus until a better be devised, and should use this anæsthetic in the large class of cases to which it is appropriate. For a full description of apparatus and mode of managing both the apparatus and the administration, see Thomas's "Manual of the Discovery, Manufacture, and Administration of Nitrous Oxide," published and sold by S. S. White, Philadelphia and New York, price $1.25.

The next anæsthetic in chronological order, but by far the most important of all, is ether, still sometimes improperly called "sulphuric ether" even by those who should know better. The great importance of ether as an anæsthetic lies in the fact that it is the most generally applicable of all, and that it is practically safe in common use. Few doubt the sufficiency of its power to produce complete anæsthesia with practical safety to life in its primary influence, the chief objection to it being the supposed difficulty of application.

And in this difficulty with ether, rather than in any better effect from chloroform, may be found the reason why it does not more rapidly take the place of the more dangerous agent in general practice.

This difficulty in successful application is not real in any sense that should be accepted by an intelligent profession whose skill involves human life, simply because it is surmountable by ordinary average intelligence and skill. The common objections to the use of ether are, that it is slow in its operation; causes a long troublesome stage of excitement; and that after these disadvantages have been submitted to, it often fails to produce a sufficient anæsthesia from any reasonable quantity that may be given. It is not uncommon to see, even in what should be the expert practice of large hospitals, four, six, and even eight fluidounces of ether used in the effort to get patients through the stages of intoxication, and a pound or more is not unfrequently consumed in a single operation. The patient and by-standers, and indeed the whole apartment, become charged with ether-vapor, to such an extent that the air must be nearly explosive, and it is rather remarkable that some accident from fire has not occurred. These efforts often require ten to twelve minutes, and then have to be supplemented by the use of one or more strong men to control the patient's struggles, and enable the operator to get unsatisfactorily through his work within a reasonable time. In not a few cases, the desirable third stage of narcosis is not reached at all.

Now, with all due deference to the well-deserved reputation of many surgeons under whose supervision and control this occurs, it is all due to mismanagement, and is easily avoided.

Dr. John Snow, of London, in his valuable book "On Chloroform and other Anæsthetics," published in 1858, covers the whole ground upon this subject, with an accuracy which time has but served to confirm. He states that the quantity of ether necessary to produce the third stage of narcosis is between four and five fluidrachms in an average of cases; but that, inasmuch as fully one half is thrown back from the lungs, about one fluidounce is usually inhaled by an adult in becoming insensible. He usually placed two fluidounces in his in-

haler, in order to have an excess in store, and this was commonly sufficient if the operation was not unusually protracted. He usually rendered adults insensible in four to five minutes, and children in two to three minutes; and never failed to produce complete insensibility in any one instance, in one hundred and sixty-four applications, which embraced all the great operations of surgery several times. These results were obtained from the use of what is known as "Snow's Inhaler," but which Dr. Snow ascribes to Dr. Francis Sibson, and Mr. Julius Jeffries; and from ether which was at least ten per cent. more dilute than that now in common use in this country for anæsthetic purposes, the specific gravity being 0.735 at 60° Fahr., instead of 0.728 as it should be.

More recent observations, and notably those of Dr. Frederick D. Lente, formerly of Cold Spring, now of New York City, exhibit similar results without a special inhaler. This accurate and skilful observer, and earnest advocate for the general use of ether in anæsthesia, gives some of his experience in the *American Medical Times* for 1862, vol. iv., p. 356, and for 1863, vol. vii., p. 95. The results obtained in this published record were by the use of the cone, extemporaneously formed of coarse towels for each application, and with ether containing not over six or seven per cent. of alcohol and water, s. g. 0.725 to 0.728 at 60° Fahr. The time required to produce anæsthesia, or the third stage of narcosis, the quantity of ether consumed, and the operations for which the anæsthesia was induced, are as follows: 2½ minutes, 1½ (f.) ounce, trephining; 5, 4, 3, and 2½ minutes, 16, 12, 12 and 10 (f.) drachms, four amputations of the thigh; 2 minutes, 7 (f.) drachms, extraction of a ball from the tibia; 4 minutes, 12 (f.) drachms, searching for a ball in the knee-joint; 3 minutes, 16 (f.) drachms, amputation at the knee; 30 seconds, 6 (f.) drachms, incision of an infiltrated scrotum; 70 seconds, 10 (f.) drachms, exsection of the shoulder-joint; 62 seconds, 6 (f.) drachms, exsection of the humerus; 3 minutes, 12 (f.) drachms, counter opening of the knee for the extraction of a ball; 3 minutes, 16 (f.) drachms, searching for a ball in the thigh. Average time for 13 administrations less than 3 minutes, average quantity less than 12 (f.) drachms. The second list published by

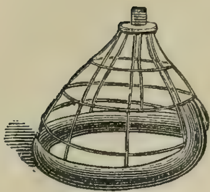

Fig. 1.

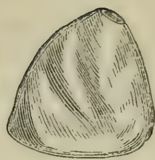

Fig. 2.

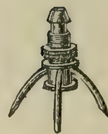

Fig. 3.

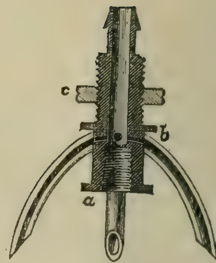

Fig. 4.

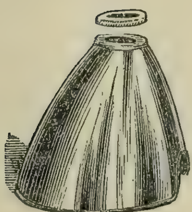

Fig. 5.

Fig. 6.

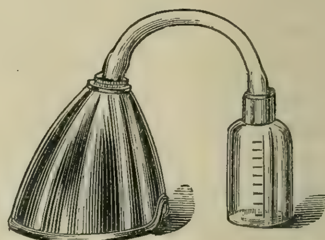

Fig. 7.

Ether Inhaler of Dr. F. D. Lente, of New York City.

Fig. 1. Skeleton of wire with brass nipple at the top, and bound round at the bottom so as to form a cushioned rim for close application to the face, and notched out for the nose.

Fig. 2. A flannel bag to fit over the skeleton frame as far down as the cushioned border.

Fig. 3. A brass mounting to screw on to the nipple of the skeleton frame.

Fig. 4. The same brass mounting, shown in enlarged section, to screw on to the nipple of the skeleton frame by the lower part (*a*). The upper projection is bored out down to *b*, and three equidistant small brass tubes, curved to suit the convexity of the skeleton frame, are made to communicate with the bore internally so as to make a continuous passage from the apex of the nipple to the end of each small tube.

Fig. 5. An impervious cover of tin notched out for the nose, which is put on over the brass mounting, and held in place by a screw-collar (*c*), Fig. 4.

Fig. 6. An ordinary phial of about four fluidounces' capacity, marked in divisions of half a fluidounce, with a horn cap and nipple cemented on to the mouth and neck.

Fig. 7. The complete inhaler ready for use; the face-piece and bottle connected from their respective nipples by a short piece of india-rubber tubing.

Dr. Lente embraces 32 complete cases, a large proportion of which are for minor operations (9 for tooth extraction), in which the average time was but little over 3 minutes, and the average quantity less than 9½ fluidrachms. Subsequent to this experience this same observer devised an inhaler, which for simplicity of construction and management, and for effectiveness and economy in results, leaves very little to be desired. The description and cut of this instrument, which are reproduced here, are copied from the *Medical Record*, for May 1, 1866, vol. i., p. 114.

"It consists, first, of a light wire, helmet-shaped frame-work, Fig. 1, so formed at the base, which is bound with a soft cushion, as to fit over the nose and chin, but not to cover the eyes. At the apex of this cone is a small screw; over this frame-work is a cone of double flannel, Fig. 2, a hole at its apex allowing it to slip over the screw. Over this is screwed an arrangement, shown of proportionate size by Fig. 3, and in enlarged section by Fig. 4, consisting of a short tube about half an inch in diameter, and branching into three small tubes, so arranged, when adjusted, as to embrace and open upon the flannel cone at equal distances from each other, at about one-third of the height of the cone. Over this tube is slipped a cone of tin, or of some impervious material, Fig. 5, not easily acted on by ether. This cover is kept in place by a nut screwing over the tube; over the end of the latter is drawn a rubber tube about half an inch in diameter, the other end of which is to be slipped over the neck of a suitable bottle, containing about four ounces of ether, as soon as the inhaler is required for use; or over the end of a metal tube fitted to a cork which may be attached to any bottle, but the other mode of connection is the safer.

"Having explained to the patient the manner of breathing, viz., to inhale as *rapidly and fully* as possible, as long as he retains consciousness, and *not to be alarmed* at any unpleasant sensations which may be excited at first, the cone is fitted as accurately as possible to the face; the wire and tin being bent a trifle if necessary; and, as a *sine qua non* of the successful use of the instrument, I insist that, having been once placed

on the face, it is to be kept *closely* applied, and never once removed ever so little, until anæsthesia is complete."

This description is followed by details of the application and advantages of the inhaler, and remarks on the use of ether, which may be referred to with advantage. This instrument, under the title of Dr. Lente's Inhaler, may be had of the New York surgical-instrument makers.

Still later, Dr. D. H. Goodwillie, of New York City, published in the *Medical Record*, for December 2, 1867, vol. ii., p. 453, an account of an inhaler devised by him, wherein a two-way stop-cock enables the manipulator to regulate, and alter from time to time, the proportions of any anæsthetic vapor and the air in the inspired mixture. This inhaler is patented, however, and therefore does not deserve professional consideration.

The small experience of the writer, which is unenumerated, and therefore hardly worth mentioning, is less favorable than that of Dr. Snow and Dr. Lente. The average time may perhaps be safely estimated at 6 minutes, and the quantity of ether at 12 fluidrachms to produce anæsthesia, and 16 to 18 fluidrachms as the average total quantity for operations, excluding those which require less than two minutes. This is mentioned not as the result of expert skill with a good inhaler, but of ordinary intelligence and common-sense, with a simple home-made contrivance, to be referred to hereafter.

Dr. Snow states that ether is required in eight or ten times the quantity that chloroform is, but that, as ether anæsthesia is more persistent than that by chloroform, and easier maintained, the disproportion in quantity is reduced in proportion to the duration of the anæsthesia. Dr. Snow also states that the proportion of chloroform vapor in the inspired air should be from four to five per cent., but with ether the proportion of vapor must be about thirty per cent. to secure anæsthesia within a convenient time. Time and experience have abundantly confirmed these statements, with the very important addition that, while this proportion of chloroform vapor cannot be greatly exceeded without largely multiplying the risks, the proportion of ether vapor may be exceeded very far, even to approaching asphyxia by exclusion of air, with comparatively small risk.

The difficulty with chloroform is, to secure a sufficient and uniform dilution of the vapor inhaled, but with ether the difficulty is to secure a sufficient concentration, or, what is the same thing, to prevent undue dilution. Both agents will occasionally suddenly suspend the respiratory movements, but while the circulation continues these are restored by new vital power. Chloroform, however, and chloroform alone, is liable to suspend the heart's action, and when this occurs suddenly and completely the source of vital power is cut off, and the danger becomes extreme. The vapor of either agent may be so administered as to produce only excitement and intoxication ; or may be so administered as to cause death by asphyxia, as in drowning. Neither vapor is irrespirable; that is, the vapors do not cause spasmodic closure of the glottis, and this perhaps chiefly because their primary effect is to anæsthetize the lining membrane of the air-passages beyond the power of responding to their irritant effect. Hence, reflex action being thus suspended by the local anæsthesia, there is no natural or organic control to the introduction of the vapors, as in the case of vapors which are irrespirable; but, so long as the mechanical act of respiration continues, the manipulator holds the issue of life and death, from this cause, in his hands. This mechanical act of respiration depends for its continuance upon the circulation of aërated blood, and the laws of diffusion of gases and vapors forbid the introduction of these vapors under any ordinary supposable circumstances without some admixture of air. Although possible, it is far less easy to drown patients by exclusion of air with these vapors than with nitrous oxide; and far more easy with ether than with chloroform, because with the latter agent death occurs from its asymmetrical toxic effect long before the effects of exclusion of air are reached in most cases. According to Dr. Snow, when air is saturated with ether vapor at 80° Fahr., one hundred cubic inches of the mixture consists of twenty-nine cubic inches of air and seventy-one cubic inches of ether vapor. With chloroform, under the same conditions, the one hundred cubic inches of the mixture consists of seventy-four cubic inches of air and twenty-six cubic inches of chloroform vapor, the terms being nearly reversed. Hence, if death occurred only by exclusion of air, ether would be nearly three

times more dangerous than chloroform, and nitrous oxide most dangerous of all. This, however, is only the negative side of the question, and when the positive side is stated the case stands very differently; for if death occurred only by symmetrical and regularly-progressive narcosis, the agent having the greatest power in a given quantity of it must be the most dangerous to life. Add to this the fact which experience alone could establish, and which experience has now abundantly established, that the more powerful agent, chloroform, occasionally causes death by an irregularity in its action, an asymmetrical narcosis, which it is impossible to foresee or prevent. The application of ether is, therefore, comparatively safe from symmetrical narcosis; and is absolutely safe from the asymmetrical narcosis to which chloroform is liable. Why, then, does it not more rapidly take the place of the more dangerous agent as the general anæsthetic? The answer is, because it appears inconvenient for prejudiced and unthinking people to procure the inhalation of its vapor in a sufficient state of concentration. When properly managed, if not quite as prompt as chloroform, it is as prompt as any anæsthetic can be to be safe; and as prompt as it need be, or should be, in the production of so grave a pathological condition. The whole question, then, turns on its administration in a state of sufficient concentration, while it is proved to be difficult to get it too much concentrated. This essential point of concentration of the vapor has long been recognized by all who are successful in the use of ether, as indicated in the efforts to get close-fitting cones, sponges, and mouth-pieces, and the uniform directions to press these firmly over the mouth and nose. The closeness of this application, and the pressure necessary to maintain it with any degree of effective uniformity, are serious obstructions to respiration at the same time that a foreign vapor is substituted for a portion of the air. This is commonly submitted to by intelligent patients, so long as reason and self-control are not materially impaired. But when the stage of intoxication overpowers reason, and the organic animal instincts are left uncontrolled, the imperious necessity to breathe brings on that struggling and resistance which so interfere with the success of the continuous administration in many

cases, because the slightest derangement of the apparatus is so liable to cause an over-dilution of the vapor by the external air.

This inconvenience is so prominent in the use of ether, and causes such an enormous waste of the anæsthetic, that the writer has long looked for some simple device, which, by interfering less with the mechanical act of respiration, and confining the vapor better, might prove useful in less intelligent or inexpert hands. To effect the objects in view, the bag so long in successful use with nitrous oxide supplied the essential idea, and it was only necessary to render this pervious to air to a limited extent, and adapt it to the use of a liquid and its vapor, instead of a gas.

Now, it must never be forgotten that the simple cone of towels supplies all that is needed in the hands of Dr. Lente and many others; and that for a still larger class of manipulators Dr. Lente's admirable inhaler will leave nothing to be desired, for it is extremely doubtful whether failure is possible with any moderately-intelligent use of this instrument. And further, it must never be forgotten that success or failure belongs far less to any special mechanical means, than to the knowledge and skill with which these are applied. The value of a billiard-cue to effect its object depends so much upon the experience and skill of the hand and eye that use it, that without the skill it is but a stick in the wrong place. The inventor of an admirable mechanical contrivance (Mr. R. Dudgeon, the inventor of the hydraulic jack) was beset for directions how to apply the machine. After spending much time and labor in specific replies, his experience taught him that this was, in a large proportion of cases, wasted. So he abbreviated this labor, and told his correspondents that, although he might sell them the very finest fiddle and bow, the sending them the very best instruction-book in the world would not supply the place of brains in learning how to play the fiddle.

It may be safely said that apparatus never succeeds in any thing. All it can do is to supplement the amount of intelligence with which it is applied; while in apparatus generally ingenuity often conceals a want of practical utility.

The simple apparatus for administering ether vapor, now to

be alluded to, was first made and used by the writer about a year and a half ago, and it has been distributed to various persons for trial since that time. In a few hands it has been moderately successful, and is retained in use with supposed advantage. In others it was successful at first, as a novelty, but was soon discarded for the older sponge or cone of towels. In others it was used with partial success, but needed improvements which could only be made at the expense of simplicity and cheapness. In others it was entirely unsuccessful; while some have not reported their results, and it is fair to consider such as being unfavorable. In Bellevue Hospital, where, for many years, ether has been exclusively and largely used, although it was explained and applied there by the writer, it utterly failed in gaining any favor at all, and was soon laid aside in favor of the simple cone of towels, with which, and commercial ether, the best results seem to be obtained. In another hospital it had better success, and is in practical use.

The average drift of all this testimony makes it somewhat doubtful whether it is worth describing, but one point induces the writer to give it the benefit of the doubt, and that is the almost unanimous testimony to its economy in the use of ether in proportion to the effect obtained. This, in connection with the admitted fact that it will accomplish the object, will justify any one who is at all dissatisfied with other modes of administration in giving it a fair trial. Half a dozen of them are herewith offered for trial to any who will accept them, and from these they may be home-made almost without expense. The surgical-instrument makers will, of course, soon furnish them at a trifling cost should they be demanded.

As shown in the adjoining sketch, the apparatus consists of an hour-glass-shaped muslin bag, Fig. 1, which, when laid flat, is about twenty inches long by nine inches wide at the widest part, one end of which is cut off so as to be funnel shaped, and open to receive the lower part of the face. This funnel-shaped mouth of the bag is of such a size as to admit the nose, mouth, chin, and beard of an adult male, and may be adapted to any smaller face by turning it back like a cuff, as in Fig. 4. The muslin of this end of the bag is double, to afford additional obstruction here to the passage of air and ether vapor.

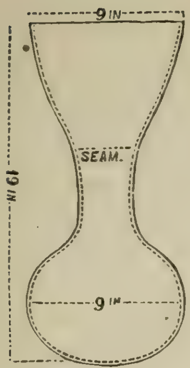

FIG. 1.

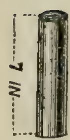

FIG. 2.

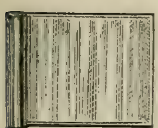

FIG. 3.

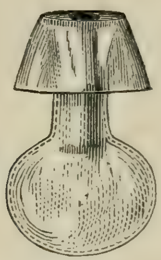

FIG. 4.

BAG FOR ETHER ANÆSTHESIA.

FIG. 1. Size and shape of thick muslin, two pieces of which stitched together by "pudding-bag seam" all round, excepting the straight top or mouth of the bag, the muslin of each piece being double at the upper part (*a*).

FIG. 2. Tin tube two inches in diameter by seven inches long, the edge of the tin being turned in instead of out at the ends, so as to offer an obstruction to the falling out of the roll after it is slipped into place.

FIG. 3. A piece of flannel laid on a piece of stiff blotting-paper or blotting-board, each about six and a half inches wide by eighteen inches long, and the two rolled up together so as to slip easily into the tin tube.

FIG. 4. The bag in readiness for application to a child. That is, with the upper double part turned back like a cuff, so as to allow the chin, nose, and mouth, to occupy a narrower portion of the bag. The tin tube is slipped farther through, into the round part of the bag.

The narrow part of the bag is made elongated, so as to receive a tin tube, Fig. 2, about seven inches long and two inches in diameter. And the bottom of the bag or round end is made of such a size that, when moderately distended, it holds say forty or fifty cubic inches, or more than is necessary for a full inspiration. When about to be used, this bag is thoroughly wetted in water, and squeezed so that it does not drip, for the purpose of rendering it only partially pervious to air and ether vapor. It is not certain that an impervious bag would not answer as well, but it would be more difficult to obtain, more expensive, less cleanly, and, perhaps, less safe. The sole object of the tin tube is to keep the narrow portion of the bag distended while in use. A piece of flannel about six and a half inches wide and eighteen inches long, and a piece of thick blotting-paper or blotting-card of the same size as the flannel, completes the apparatus. The flannel is laid upon the blotting-board, and the two are rolled up together, Fig. 3, into a roll or spiral which will slip into the tin tube, and when there spring out sufficiently to retain its place loosely. A two-ounce graduated measure, and a can or bottle of ether, are all that are now required for the anæsthesia.

The patient to be anæsthetized being fasting, takes, about fifteen minutes before the time set for operation, a fluidounce or a fluidounce and a half of brandy or whiskey, if an adult male, or two fluidounces of wine if a female. This, upon an empty stomach, will produce slight intoxication in about ten minutes, and the anæsthetic has only to supplement this in order to get quickly through the stage of excitement in many cases. It also renders retching less likely to occur. The patient is then placed quietly on the table, and is advised, in a slow, quiet tone, to be composed and perfectly still. He is told that he will soon begin to feel intoxicated, or excited and restless; that this is very much under his control, and that the more he resists it the sooner he will be asleep. If this advice be given with tact and skill, it will be well received, and be of service in a majority of cases. The manipulator is then to wet the bag thoroughly, squeeze out the water till it no longer drips, slip the empty tin tube into its place in the narrow part

of the wet bag, and then prepare the charge of ether. This may be done in several ways; but perhaps the best way is to pour the measured quantity of ether into a tumbler, and, having allowed the roll of flannel and blotting-board to expand itself to nearly the size for the tin tube, dip first one end and then the other into the ether until the ether is all taken up, and then at once slip the charged roll into its place in the tin tube, the latter being already in its place in the wet bag. Then fold, first one end of the wet bag and then the other, up over the part which holds the tin tube so that both ends of the tin tube may be closed up by the wet muslin to prevent loss of ether, and then lay it aside ready for use at any moment. The loss of ether, while thus lying ready, is very small—not over a fluidrachm in half an hour. The quantity of ether for the first charge should vary with the estimated sensibility of the patient. For an adult man, one and a half to two fluidounces, and for females and sensitive males one to one and a half fluidounce is sufficient, if the ether be good; for children, a half to one fluidounce. In the anæsthesia of children, and in many exceptional cases, no general rule can be laid down; and, indeed, the circumstances of each case must always modify each application; and yet the following directions may be found more or less applicable, and therefore useful in a large number of instances:

About ten minutes before the time for operation, the bag being thus in readiness, the can or bottle containing the supply of ether is held to the patient's nostrils, and he is asked to smell it strongly at each inspiration for the purpose of getting used to it. This taking the vapor from the can or bottle is continued for one minute or more, according to circumstances, during which time the advice in regard to self-restraint is firmly repeated. This step establishes tolerance or partial anæsthesia of the mucous membrane of the air-passages, and thus avoids some of the coughing and strangling that are liable to occur from the sudden application of concentrated vapor; but it often brings on hysterical symptoms or delirious restlessness pretty promptly, and whenever this occurs the bag is to be at once applied. If the ether be in a tin can, which is always the best and safest containing vessel for it, and this be

only about one-third or half full, the warmth of the hand causes a good supply of vapor, and the early stages are rapidly brought on. At most, but a minute or a minute and a half is occupied by this step, and the manipulator has still about eight minutes to the time set for operation. The bag is then unfolded, laid on the patient's chest, and the open end drawn over the mouth and nose. The redundant size is taken up in a plait by the side of the nose, and folded down so that the wet muslin is closely applied to the skin of the face, and pressed down into the fossæ on each side of the nose. The part which is least likely to lie close, and which therefore requires most attention, is that under the chin. The most convenient place for the manipulator is at the head of the table, whence he can best apply a hand to either side of the patient's face, and thus support the bag in position without much pressure. The thumbs then naturally fall into the fossæ on each side of the nose, while the fingers support the part under the chin, care being taken not to press upon the larynx. If the patient has a beard, it should be wetted to render it less pervious to air, and the bag drawn tightly around it. If the muslin be well wetted, it sticks pretty closely to the skin, where it gets contact, and the beard offers the chief difficulty. It not unfrequently happens that, after a few inspirations of the concentrated vapor, respiration is suspended. When this occurs the bag is removed till it is resumed, the mouth of the bag being simply turned back on to the bag to save waste of ether. As soon as respiration is reëstablished the mouth of the bag is replaced around the nose and mouth. When restless excitement occurs, the mouth of the bag is supported in place by the two hands of the manipulator, but without much force, and with as little resistance to the motions of the patient as possible, and with no obstruction over the mouth or nose, and the bag, under no circumstances, is to be allowed to become loose or drop off during the excited movements. The next accident likely to occur is retching, a certain degree of which may occur without the necessity of disturbing the bag; but, when actual vomiting is imminent, the bag must be momentarily removed. The patient then usually lies quiet, and soon passes into the third or required stage of narcosis, and this

often with a shudder, or slight general convulsion. The pulse, respiration, and color of the surface, being watched throughout, the eye or the roots of the nails are from time to time tried, to ascertain the condition as to insensibility, and as soon as this is fairly established the operation is begun. In a large proportion of cases not more than four of the eight minutes will have been consumed; and where neither arrest of respiration nor retching occurs not more than two or three minutes' application of the bag will be required. When the operation is fairly under way and no sensibility shown, the bag is removed to avoid the fourth, or snoring stage of narcosis, and is only replaced when some very slight sign of sensibility is seen. In a considerable proportion of operations the first charge of ether, if liberal and well managed, is sufficient, for anæsthesia by ether is quite persistent, and easily kept up, or reënforced. If the operation be long, advantage may be taken of one or more of the intervals when the bag is withdrawn, to examine the roll in the tin tube, and judge by the odor whether the supply of ether be nearly exhausted. If the odor of ether be rather feeble, two or three fluidrachms more is poured on to the roll from the measure, without removing the roll from the tube or the tube from the bag, and the mouth of the bag is turned over to prevent waste until it is needed again. A patient may even wince under the knife before it is reapplied, and yet, if there be a fresh supply of ether ready in the bag, a few inspirations will restore him to the desired third stage again. One or two minutes before the operation is complete, the bag may generally be removed entirely and finally. These precautions do much to prevent that supersaturation with ether which tends to the more certain occurrence of prolonged nausea and vomiting which so often introduce septicæmia, and thus cause death. The reaction always bears an important relation to the primary action, and, if this latter be moderate and well managed, the reaction is likely also to be moderate. The longest time during which the writer has kept up anæsthesia by this bag was about sixty-five minutes for a difficult ovariotomy, and in this the total consumption of ether was less than five fluidounces, and the recovery both from the anæsthesia and the operation was good.

If there be a prominent advantage in this apparatus, as the writer believes there is, it is in the entire freedom of the respiratory process. The lower end of the bag rises and falls with the respiration without offering any practical obstruction to the mechanical process. And those who will persevere with it until educated to its use will probably discover other advantages hardly less important.

In concluding the consideration of ether, it may be safely said that those who resort to it after a long use of chloroform, and acquire the little skill necessary to use it well, will have a sense of safety and satisfaction which they never knew before.

Chloroform is the most rapid, the most certain, and the most effective anæsthetic which has been practically applied on a large scale up to the present time. When to these prominent advantages are added the facility and simplicity of its administration, the small quantity required, the facility of getting it of good quality, its non-inflammability, its cheapness, its agreeable odor, and the prejudice in its favor to which all these circumstances will always tend, the key to its popular use is found.

The more prominent of these advantages, however, belong to its excess of power, and this excess of power involves the power to do harm. Therefore, there is another side to the account of chloroform which a long and extensive experience has accumulated against it.

In common use, though perhaps never in expert or skilful use, it occasionally causes death by progressive symmetrical narcosis. But, as this result may be admitted to be within the control of skill and knowledge to prevent it, it is not the most serious disadvantage of chloroform, and the risks it involves might be fairly accepted as being overbalanced by its advantages. But, unfortunately, chloroform occasionally causes death by an asymmetrical narcosis which is beyond human skill and knowledge to foresee or prevent. The sudden and overwhelming narcosis or paralysis of the heart, commonly called cardiac syncope, whether occurring from direct or reflex action of the anæsthetic, is fatal in a large proportion of the

cases in which it occurs, and it occurs with chloroform alone. It is not a question of submitting to these rare accidents or dispensing with anæsthesia altogether; nor as to whether they occur from chloroform or from its impurities, or from want of care in its administration, nor is it a question as to whether they occur once in five hundred and twenty-five administrations or once in forty thousand administrations. But the simple fact that they occur at all with this anæsthetic, while they do not occur in the use of other anæsthetics which are in practical successful use, and always easily attainable, ought to be sufficient to limit the use of chloroform to the comparatively few cases to which other agents are not applicable.

The fatal accidents from chloroform appear to increase in proportion to the number of administrations very rapidly as it becomes more generally used.

In the *Westminster Review*, for January, 1859, when chloroform had been in use more than ten years, Dr. John Chapman makes a rough though reasonable and useful computation of the proportion of deaths to administrations, and his results are one death in every sixteen thousand administrations. Dr. Sansom states that in the obstetric practice of London it was estimated to have been used forty thousand times without an accident. Dr. Sansom, in 1866, also states that in the French Eastern campaign it was administered thirty thousand times or more without an accident; and in the English Eastern campaign there were but two deaths in an unknown but very large number of administrations. In 1865 Dr. Anstee, of London, had administered chloroform more than three thousand times without an accident. And about this time Dr. Richardson makes a *résumé* from the records of eight large British hospitals, and reports one death in seventeen thousand administrations. Now, however, this same well-informed author, in a paper "On General Anæsthesia and Anæsthetics," presented to the British Medical Association, in August, 1870, states the general proportion of deaths to administrations as being one in twenty-five hundred, or nearly five times greater within six years. And the chairman of the association, Dr. J. Hughes Bennett, in his remarks upon the paper, thinks the proportion of deaths is greater than this. The

causes of this rapid increase can only be surmised. As some recent reports of London hospitals—notably that of Mr. C. Bader, of Guy's Hospital, three thousand two hundred and twenty-four administrations and no death—do not show a very muuch increased mortality, it is fair to infer that the largest share of the increase must fall with the greater force upon the widely-extended general popular use, where want of care and skill, and bad chloroform, may both be involved as important elements. As bearing upon this point, the writer may cite from a private letter from Dr. J. S. Wellford, of Richmond, Virginia, that, in twenty-two thousand administrations of good English chloroform during the late war, no accident occurred. But, subsequently, the same surgeons were supplied with chloroform from methylated spirit, and during its use had some deaths, although the same care and skill were used.

In this country no general statistics worthy of the name have been or can be obtained; but the deaths which occur are generally reported when in the hands of the regular profession, and generally get into the newspapers or journals through coroners' investigations, or through the keenness of reporters, when they occur in other hands. From this single element each writer has to make his own estimates. Under these circumstances this writer judges that it may be useful to present his estimates and their data, particularly as they are made up from sources not accessible to others. It must, however, be remembered that they are but rough estimates, and each reader must apply his own valuation to the data from which they are made up.

No chloroform has been imported into this country, or exported from it, within several years past, and there are but about four original sources of supply, of which the establishment of the writer is the smallest. Upon consultation with the three other sources of supply, it is found that the total quantity of chloroform sold for consumption in the United States, during 1870, cannot be less than eighty thousand pounds, though it may be somewhat more. This, and the total number of reported deaths, is all that can be had with any degree of practically useful accuracy. What follows, then,

is simple speculation or rough estimate, though probably safe in the interest of human life.

It may be estimated that not over one-third of this eighty thousand pounds, or say twenty-six thousand pounds, is used for anæsthetic purposes by inhalation. Next, it may be estimated that two avoirdupois ounces, or one and a half fluidounce is used and wasted for each administration, and this would give—

$$26{,}000 \times 8 = 208{,}000, \text{ or say } 200{,}000$$

administrations, as a very extravagantly safe estimate for the whole country during 1870.

By a pretty thorough search through the principal medical journals for 1870, only fifteen deaths can be found reported as having occurred in this country, two of which are equivocal, and one, though probably reported twice, is counted twice. Add to these one death which occurred late in the year, and but just now reported; and one death reported to the writer on hearsay, and which may or may not be among the published cases. This would make a total of seventeen deaths, or one death in eleven thousand seven hundred and sixty-four administrations. But there are undoubtedly a number of deaths from chloroform which escape even the keenness of newspaper reporters, and the number of such is variously estimated. Some estimate that not more than three-fourths of the deaths are published, while others estimate that not more than one-half are ever publicly known. The writer believes the first estimate to be nearest the truth, but adopts the last for safety. This gives thirty-four deaths, or one death in five thousand eight hundred and eighty-two administrations. If any reader judges this estimate to be still not sufficiently liberal, he may double the number of deaths once more, and he will then have one death in twenty-nine hundred administrations, and thus get the mortality up to somewhere near that of Dr. Richardson, for Great Britain. But the writer cannot admit the probability of any such mortality for this country, though he knows of no good reason why it should be so much lower here.

Here, then, is the grave and important probability that each surgeon, in offering to his patient the anæsthetic advan-

tages of chloroform, offers him in this country one chance in five thousand of sudden death, when he might give him all the benefits of anæsthesia by other agents without the risk.

The writer has neither read of nor heard of a single instance of death or grave symptoms from the use of chloroform when used in obstetrical practice for mitigating the pains of labor nor of any death from its use in controlling puerperal convulsions ; but knows of one death where it was given preparatory to the operation of turning in a case where a midwife had mismanaged and protracted a shoulder-presentation. In obstetrical practice it is comparatively rarely given to anæsthesia, but only to intoxication, and this often in the judicious, safe way of smelling the vapor from a bottle held in the hand of the attendant or nurse. And in a large proportion of cases it is only given during the expulsive pains and after dilatation, in small quantities frequently repeated and largely diluted, and given by careful hands. Prolonged experience, however, seems to indicate that some unknown condition in the parturient female renders chloroform less dangerous in obstetrical practice than in general anæsthesia, while its promptness of action renders it peculiarly applicable to the suddenness of these pains. It is also the only agent that can be effectively used in puerperal eclampsia, and in this affection has doubtless saved many valuable lives. In the comparatively small number of cases which are insusceptible to ether it is also applicable, since in all such the want of susceptibility to the less powerful agent would rationally render the more powerful agent safe.

In regard to these tolerant cases, it is very remarkable how much chloroform they may use with impunity. The greatest consumption the writer has ever met with was in a patient of Dr. Gustave Morrelli, of New York City. This patient was the widow of an Italian physician; her age was forty-eight, and her appearance healthy. She was subject to hereditary migratory gout, the sudden pain of which was so severe that she finally gave up all slower means of temporary alleviation for the prompt action of chloroform, and used it habitually for two years or more prior to her return to Europe. Between the 31st of March and the 16th of December, 1865, a record was kept, and during this time, by Dr. Morrelli's direction, she was

supplied by the writer with fifty-three pounds of purified chloroform. And Dr. Morrelli stated to the writer that, during her acute attacks, she not unfrequently used two pounds each day, and used it as economically as she could after her long practice.

The writer cannot close a paper on anæsthetics without again referring to his often-published statements, and his long use of the remarkable local and superficial anæsthetic effects of the phenols, or the so-called carbolic acid. The best of these is cresol or cresylic acid, and next phenol or the crystallized carbolic acid. But practically the cheap mixture of the two, called coal-tar creasote or impure carbolic acid, is as good as either. The prompt and complete effect of very dilute aqueous solutions of this creasote upon the pain of burns, erysipelas, etc., led the writer to infer peculiar anæsthetic properties many years ago, and the numbness or insensibility produced upon the hands by handling it confirmed the idea. The same effect in lesser degree is produced by many of the aromatic oils and turpentines, and it is highly probable that most of the liniments and embrocations which have survived the attacks of what is miscalled "rational medicine," owe their continued popular and empirical use to a real local anæsthetic effect produced by this class of substances. The Chinese have long known and used the anæsthetic effects of the essential oils of the mint family of plants, and particularly oil of peppermint, so that it is plain that these old-fashioned local applications for the relief of pain rather deserve more accurate observation and research than the contempt into which they are falling through the fashionable expectantism of the day. The writer can now, in conclusion, only beg the attention of his readers to two important papers recently published on this subject. One by Prof. Erasmus Wilson, of London, on "The Anæsthetic Properties of Carbolic Acid," in the London *Journal of Cutaneous Medicine*, an abstract of which may be found in the *Half-Yearly Abstract of the Medical Sciences*, for January, 1871, at page 93. The other is a paper published in the *American Journal of Medical Sciences*, for October, 1870, page 573, on "The Application of Carbolic Acid as a Local Anæsthetic in Surgical Operations," by J. H. Bill,

M. D., Surgeon, U. S. Army. By this paper Dr. Bill is the first to propose and apply this anæsthetic to surgical operations.

Art. II.—*On the Education of Deaf-Mutes.* By Adolph Kessler, M. D., Physician at Castle Garden, New York.

The subject of the education of deaf-mutes and the satisfactory solution of the vexed problem regarding the most rational and beneficial system by which this unfortunate class may be made useful members of the human family, are of such paramount importance to humanitarians in general, and to physicians in special, that I venture to offer a few remarks. While abroad and in the pursuit of otological studies I learned to take a deep interest in deaf and dumb institutions, and made it an object to visit them whenever I met with an opportunity; I came thus to see and to study the working of many celebrated asylums in Germany, France, etc., and what I state in this paper is to a great extent the result of individual observation and experience.

I wish above all to contrast with the American, or more correctly speaking, the French system, as founded by the Abbé de l'Epée, and introduced here by some of his disciples, the German system, which, although a century old, is yet little known and practised in this country. While the former confines itself almost exclusively to signs, pantomimes, and the finger-alphabet for the purposes of instruction and communication, the latter makes but little use—and this is only in the commencement—of these auxiliaries, and operates chiefly through articulation and lip-reading. French and American writers are in the habit of calling the German system an "experiment" and "a theory yet to be proved," but lose sight of the fact that Samuel Heinicke reduced that theory to practice in his school at Eppendorf, near Hamburg, as long ago as 1769. He was the founder of the German system, the first to teach deaf-mutes the living word, and his glorious work, although for many years unappreciated and neglected, has, under the hands of earnest, intelligent, and enthusiastic pupils and followers, been revived and perfected until it has become

the *cardinal basis* for deaf-mute instruction in all the institutions of Germany, and thence been transplanted into many other countries.

In speaking of deaf-mutes, it is necessary to separate that class of patients whose primary affection is not seated within the ear alone—the labyrinth and auditory nerve—but within the cerebrum, affecting alike the acoustici and the nerves supplying the tongue, the lingual muscles and the larynx, viz., the vagi and hypoglossi. Such cases, usually complicated with cretinism and essential organic defects, are of course beyond all redemption and would baffle any and every attempt at articulation, for not only are the articulating organs deprived of their motive power, but the intellectual stimulus to language is also wholly wanting.

However, the great majority of deaf-mutes are fortunately deaf only and rendered dumb alone by the eternal, never broken silence reigning around them at a period of life when language is yet a sealed book to them, or so insufficiently developed that it is effaced from memory in the course of time, and thus totally lost. This fact is fully established by statistics and pathological anatomy, and it is certain that the number of congenital deaf-mutes is small in comparison with those who acquire their misfortune during the first years of life after an attack of meningitis, typhoid fever, scarlatina, and other pernicious diseases. To that large majority of deaf-mutes whose intellect and articulating capacity are unimpaired no greater blessing can be imparted than the faculty of reading the thoughts of others from their lips and of expressing their own by living speech. That alone restores them truly and fully to society from which they are excluded by a cruel fate, that alone can invigorate their respiratory organs, promote their physical well-being, enlarge their mental sphere, banish suspicion, gloom and melancholy, animate hope, and kindle aspirations. Does the German system, which strives to make the dumb speak, really deserve to be called a "departure from, and a reform against Nature," as hostile critics of the Franco-American school were pleased to style it? The faculty of speech is the exclusive privilege, the loftiest attribute of man, none the less so that it is a spontaneous gift and acquired with-

out any effort of our own, the result of mental processes incited by the sense of hearing. And can we truly estimate the suffering and misery of those who think, see, feel, and move like us, yet lead only half a life, and pass through the world like spectres, deaf and mute, not hearing and not heard? Have they not a right to demand of us the restoration of this their foremost prerogative? As long as eye and touch are able to teach articulate language, it is our duty to impart it; and we must not tire in the effort, and endeavor to redeem the misfortune of our fellow-beings.

In the deaf-and-dumb institutions of Germany, about eighty in number, articulation and lip-reading are not only taught, but form the basis of all instruction. All pupils, without exception, that are capable of being taught, learn to read the thoughts of others from their lips, and learn to speak. At first they communicate only through signs, these being necessarily the first element of establishing an interchange of thoughts, but as soon as they get the first idea of their power of articulating, as soon as they begin to master the vowels and consonants, and to utter interjections and short words, they are made to develop with indefatigable industry the hidden resources within them and gradually build up the treasures of language, cheerfully discarding the dead signs and soulless pantomimes of a former period. Eye and touch guide them in lip-reading and articulation, and these senses become in the course of time, according to a law of Nature, as powerful agents and auxiliaries as the ear is in normal individuals. Commencing with the articulation of *a*, *o*, *u*, *au*, *ei*, *b*, *d*, *f*, etc., proceeding then with the pronunciation of simple words, nouns, adjectives, verbs, etc., they learn by degrees to express in words the relation of things, to master the formation of short sentences, their connection with others, and the faculty of describing objects and scenes within their sight and experience. The sphere of conceptions and ideas becomes enlarged and the articulation improved by the reading aloud of books, by recitations and compositions; all sign-language is rigidly banished from the higher classes, and the pupils are bound to communicate with their teachers and with each other by the spoken word only. Thus all branches usually taught in ordinary schools—arith-

metic, natural history, geography, history, etc.—are imparted to the speaking and apparently hearing deaf-mutes.

The mode of instruction in the more advanced classes of the deaf-and-dumb institutions of Germany does in matter and in manner not materially differ from that in common schools, and the casual observer is scarcely aware of the presence of a class of deaf-mutes, so successful is their disguise.

They speak well and almost fluently, answer promptly and intelligently questions propounded to them, and their voices, far from being strange and unearthly, as has been asserted by the advocates of the French method, appear in numerous instances nearly normal, only somewhat monotonous and lacking that fine modulation which the ear alone is able to impart and control, and in almost all cases perfectly intelligible. And even in that respect perseverance accomplishes wonders, deaf-mutes gradually becoming possessed of a very acute feeling for the vibration of their vocal chords, for the various grades of pressure of the air-column passing through the larynx and trachea, and for the tremulous motions of the articulating organs, and in consequence of these sensual perceptions obtaining a sure criterion for their phonical efforts. Newly-received mutes are exercised month after month in the exact articulation of consonants and their different combinations, long and short, rough and smooth, as they occur in speech, without the addition of vowels. In this way the articulating organs become very pliant, and the speaking sound assumes afterward, when the vowels are added and words pronounced, with most deaf-mutes an almost normal character. Beastly, howling, and yelling voices, so characteristic of untutored or unpliable deaf-mutes, are not heard in German institutions.

The more advanced pupils frequently engage in the rendering of plays, and from an improvised stage speak and act before large audiences with considerable skill and pathos. I could enumerate, if space permitted, a number of deaf-mutes who have not only achieved great success as teachers of their unfortunate companions, but also fame as writers and authors. I could mention instances when, in conversation with deaf mutes, I was left wholly ignorant of their condition, and more than once it happened to me that officials connected with

German institutions, who showed me around and explained things, surprised me afterward with the information that they were themselves deaf-mutes. They were, indeed, triumphant witnesses and examples of the German system of lip-reading and articulation; and, if they appeared indeed to be specimens of the most favored class, the excellence of the system became none the less apparent. Moritz Hill, instructor in the teachers' seminary at Weissenfels, Prussia, a generally-recognized authority on the subject of deaf-mute education, and withal a man of the ripest judgment and justest discrimination, who has contributed many valuable works, and taught the discipline under consideration for forty-six years, says: "Out of a hundred pupils, eighty-five are capable, when leaving school, of conversing on commonplace subjects with their teachers, family, and friends; sixty-two can do so easily, eleven converse readily with strangers, and others learn to do this after leaving school."

And what is the opinion of Dr. Hirsch, formerly of Cologne, and at present director of the Asylum at Rotterdam, Holland, the ablest teacher and most distinguished authority on matters relating to the education of deaf-mutes—the man who has carried the German system into the Netherlands, Belgium, England, etc., and founded institutions there after the German model? In an address recently delivered before the Scientific Congress of the Netherlands, and which he was kind enough to send to me, he says: "The object to be attained is, to render possible the admission of the deaf-mute into society by teaching him to see, that is, to understand, the movements of the lips, and to speak in his turn. To attain this end, the act of seeing or comprehending and of speaking must be made the *exclusive principle of instruction*, and neither the finger-alphabet nor the language of signs can have any connection with it. The daily observation which I have made for more than thirty years that I have devoted to the deaf and dumb has convinced me that the art of seeing speech in the movements of the mouth is the most important of all the branches of instruction, and that therefore it should be most sedulously cultivated. Next to the art of seeing or understanding, the act of speaking is the principal object of instruction of the

deaf-mutes. *By this system ninety-nine out of every hundred deaf-mutes may be taught*, and their progress will depend entirely on the talent and patience of the teacher. *This truth, too long and coldly doubted*, is now penetrating everywhere."

I might crowd testimony upon testimony, and carry conviction even to the most skeptical, that the German system of deaf-mute education is any thing but an empty theory and experiment, but to what purpose? I content myself with quoting one more, an English authority: "In the London Asylum and in Donaldson's Hospital, Edinburgh, *articulation is professedly and systematically taught to every pupil.* In other British institutions it is taught in certain cases only. Very decided and opposite views are held upon the subject, but the question is *practically determined*, in most cases, by the financial difficulties. It would require more time and a larger staff of assistants to teach articulation to the other subjects of instruction, than the moderate means of the institutions generally could afford."

This is a true and sensible explanation of the difficulty, and, no doubt, the chief clew to the opposition the German system encounters in this country, apart perhaps from the fact that teachers are apt to suspect a new system, the practical working of which is not thoroughly comprehended, and reluctantly sacrifice a method that has become dear to them, and apparently very successful in its operations. To deny the excellence of the system on the score of inherent defects and physiological impossibilities, as American writers have done, is to bestow upon its promoters a *testimonium paupertatis mentis*, and implies a culpable ignorance of the splendid and palpable results achieved in nearly a hundred institutions by persistent labor, and with great difficulty and expense; to deny its practicability here on account of a lack of teachers and funds is more excusable, yet certainly not cogent, considering that this country is second to none in wealth and intelligence.

The French or American system is good and useful as far as it goes, but it is altogether too narrow, too mechanical, too rigidly conservative, and apparently untouched by the spirit of progress and reform which characterizes this era. It makes of

its pupils mere thinking-machines and pantomimes, and confines them within a very contracted sphere. Its chief and only reliance, besides the written word, are artificial, arbitrary signs and the finger-alphabet, methods of communication which are of a purely mechanical character, and not only incomprehensible to the great mass with whom the deaf-mutes are to associate in after-life, and therefore worthless for all practical purposes, but also absolutely injurious to their intellectual progress, as they are bound to depend upon signs as the only channel and bridge connecting them with the world. If the German schools, therefore, reject the finger-alphabet, or any other mechanical system of artificial signs,[1] they do it from motives at once the most practical and the most philosophical. Even admitting that lip-reading and articulation have not led to *perfect* results and not benefited all alike, it must be remembered that thousands have been fully restored to society and to the freest communion with their fellow-beings. To repudiate the German system of deaf-mute education, the instruction in articulate human language, because it does not reach and benefit all alike, is a poor argument; if that were to hold good, we would be under the necessity of parting with the most beneficial systems and the most valuable remedies, perfection being as yet not a recognized attribute of human kind and things. The enemies of science and progress might just as well repudiate the teachings of the telescope, the microscope, etc., on the ground that they reveal only part of the truth, leave so much yet in the dark, and are unable to accomplish all they undertake. The all-important problem of the education of deaf-mutes is, in my opinion, already solved in Europe, and the almost universal verdict is in favor of the German system, as the one best adapted to promote the true interest of that unfortunate class, and to render them happy and useful members of the human family. It is everywhere supplanting the French system. Switzerland, Russia, and

[1] Of course I have no reference to the *natural signs*, the simple, inborn, untaught, and unteachable signs of Nature, which serve as a means of communion for all human beings, the hearing as well as the deaf, and that are closely interwoven with the mental constitution of man, but to those only that are invented and composed for the special purpose of deaf-mute teaching.

Austria, have long ago adopted it; Scandinavia, Holland, and Belgium, are Germanizing their institutions, and have called German teachers and principals to take charge of them; and England and France have begun to move in the same direction. "Deaf-mutes are speaking in England" is announced as a wonderful novelty by British papers and magazines. In this country also efforts are making to supplant the time-honored French method, but unfortunately they are counteracted by influential and powerful movements in the opposite direction. Yet Heinicke's system is destined to triumph, not only in Europe, but also in America, and all over the civilized world, for it is closely identified with progress and humanity.

Abbé de l'Epée, certainly one of the greatest benefactors of mankind, whose memory is immortalized in prose, poetry, and sculpture, and whose name should be honored by the remotest posterity, gave to the deaf-mutes the *sign language* and the *written word*, but he left them in their dumbness incapable of exercising the highest and the noblest privilege of man—the faculty of speech. Samuel Heinicke, however, though less known to fame, did more yet; he bridged over the deep, awful chasm separating the deaf-mutes from the world around them, and gave them the *living word*.

Before bringing this article to a close, I would add the concluding sentences of a letter,[1] received from my friend Dr. Hirsch, whose authority as a teacher of deaf-mutes is everywhere recognized, no less in this country than throughout Europe:

1. The object to be attained by the instruction of the deaf and dumb is to give them, in lip-reading and in speaking, the best means to be restored to society, on the same footing with their fellow-creatures that are blessed with speech.

2. To attain this end they must learn to think imme-

[1] It is, perhaps, not quite irrelevant to remark here that Dr. Hirsch's personal and influential efforts aided me greatly in the task I had undertaken, about a year ago, in a series of articles, of defending and extending the knowledge of the German system of deaf-mute education, and especially in the controversy which thence arose with some of the ablest and most prominent representatives of the Franco-American method, with gentlemen having charge of the oldest and most reputed asylums in the country.

diately in words, and therefore the art of seeing or comprehending, and of speaking, must be the exclusive *basis* of instruction; that is to say, the teacher must pronounce at first a vowel, a consonant, a syllable, afterward a word, and the pupil must read it from his lips, and then pronounce it himself. The teacher speaks, the pupil reads from his lips, the pupil speaks himself, the teacher gives the meaning—*this order* must be maintained during the whole course of instruction.

3. *Artificial* signs and the manual alphabet must be excluded.

4. *Natural* signs are indispensable for the teacher, to be understood by beginners—indispensable for giving the meaning of the words, inasmuch as this is not to be done by intuition or by words. From this results, however, that the use of natural signs must diminish according to the progress of the pupils in speech, so that at last the application of natural signs is reduced to those generally employed by people of sound hearing.

5. Lip-reading and speaking must, therefore, not only be an *object* of instruction, but every word the deaf-mute has learned to read from the lips and to speak must immediately be made a *means* of instruction and communication; so that lip-reading and speaking finally become for the deaf and dumb what the act of hearing and speaking is for their more fortunate fellow-creatures.

6. Lip-reading and speaking are the most essential branches of the instruction of deaf-mutes. In comparison with each other, lip-reading has still more value than speaking. The art of writing is next in importance, still more so for deaf-mutes than for people that can hear.

ART. III.—*Valedictory Address, delivered to the Graduating Class of the Bellevue Hospital College, March* 2, 1871. By OLIVER WENDELL HOLMES, M.D., Parkman Professor of Anatomy and Physiology in the Medical School of Harvard University.

THE occasion which calls us together reminds us not a little of that other ceremony which unites a man and woman

for life. The banns have already been pronounced which have wedded our young friends to the profession of their choice. It remains only to address to them some friendly words of cheering counsel, and to bestow upon them the parting benediction.

This is not the time for rhetorical display or ambitious eloquence. We must forget ourselves, and think only of them. To us it is an occasion; to them it is an epoch. The spectators at the wedding look curiously at the bride and bridegroom; at the bridal veil, the orange-flower garland, the giving and receiving of the ring; they listen for the tremulous "I will," and wonder what are the mysterious syllables the clergyman whispers in the ear of the married maiden. But to the newly-wedded pair what meaning in those words, "for better, for worse," "in sickness and in health," "till death us do part!" To the father, to the mother, who know too well how often the deadly nightshade is interwoven with the wreath of orange-blossoms, how empty the pageant, how momentous the reality!

You will not wonder that I address myself chiefly to those who are just leaving academic life for the sterner struggle and the larger tasks of matured and instructed manhood. The hour belongs to them; if others find patience to listen, they will kindly remember that, after all, they are but as the spectators at the wedding, and that the priest is thinking less of them than of their friends who are kneeling at the altar.

I speak more directly to you, then, gentlemen of the graduating class. The days of your education, as pupils of trained instructors, are over. Your first harvest is all garnered. Henceforth you are to be sowers as well as reapers, and your field is the world. How does your knowledge stand to-day? What have you gained as a permanent possession? What must you expect to forget? What remains for you yet to learn? These are questions which it may interest you to consider.

There is another question which must force itself on the thoughts of many among you: "How am I to obtain patients and to keep their confidence?" You have chosen a laborious calling, and made many sacrifices to fit yourselves for its suc-

cessful pursuit. You wish to be employed that you may be useful, and that you may receive the reward of your industry. I would take advantage of these most receptive moments to give you some hints which may help you to realize your hopes and expectations. Such is the outline of the familiar talk I shall offer you.

Your acquaintance with some of the accessory branches is probably greater now than it will be in a year from now—much greater than it will be ten years from now. The progress of knowledge, it may be feared, or hoped, will have outrun the text-books in which you studied these branches. Chemistry, for instance, is very apt to spoil on one's hands. "*Nous avons changé tout celà*" might serve as the standing motto of many of our manuals. Science is a great traveller, and wears her shoes out pretty fast, as might be expected.

You are now fresh from the lecture-room and the laboratory. You can pass an examination in anatomy, physiology, chemistry, materia medica, which the men in large practice all around you would find a more potent sudorific than any in the Pharmacopœia. These masters of the art of healing were once as ready with their answers as you are now, but they have got rid of a great deal of the less immediately practical part of their acquisitions, and you must undergo the same depleting process. Hard work will train it off, as sharp exercise trains off the fat of a prize-fighter.

Yet, pause a moment before you infer that your teachers must have been in fault when they furnished you with mental stores not directly convertible to practical purposes, and likely in a few years to lose their place in your memory. All systematic knowledge involves much that is not practical, yet it is the only kind of knowledge which satisfies the mind, and systematic study proves, in the long-run, the easiest way of acquiring and retaining facts which are practical. There are many things which we can afford to forget, which yet it was well to learn. Your mental condition is not the same as if you had never known what you now try in vain to recall. There is a perpetual metempsychosis of thought, and the knowledge of to-day finds a soil in the forgotten facts of yes-

terday. You cannot see any thing in the new season of the guano you placed last year about the roots of your climbing plants, but it is blushing and breathing fragrance in your trellised roses; it has scaled your porch in the bee-haunted honeysuckle; it has found its way where the ivy is green; it is gone where the woodbine expands its luxuriant foliage.

Your diploma seems very broad to-day with your list of accomplishments, but it begins to shrink from this hour like the *Peau de Chagrin* of Balzac's story. Do not worry about it, for all the while there will be making out for you an ampler and fairer parchment, signed by old Father Time himself as President of that great University in which experience is the one perpetual and all-sufficient professor.

Your present plethora of acquirements will soon cure itself. Knowledge that is not wanted dies out like the eyes of the fishes of the Mammoth Cave. When you come to handle life and death as your daily business, your memory will of itself bid good-by to such inmates as the well-known foramina of the sphenoid bone and the familiar oxides of methyl-ethyl-amyl-phenyl-ammonium. Be thankful that you have once known them, and remember that even the learned ignorance of a nomenclature is something to have mastered, and may furnish pegs to hang facts upon which would otherwise have strewed the floor of memory in loose disorder.

But your education has, after all, been very largely practical. You have studied medicine and surgery, not chiefly in books, but at the bedside and in the operating amphitheatre. It is the special advantage of large cities that they afford the opportunity of seeing a great deal of disease in a short space of time, and of seeing many cases of the same kind of disease brought together. Let us not be unjust to the claims of the schools remote from the larger centres of population. Who among us has taught better than Nathan Smith, better than Elisha Bartlett? who teaches better than some of our living contemporaries who divide their time between city and country schools? I am afraid we do not always do justice to our country brethren whose merits are less conspicuously exhibited than those of the great city physicians and surgeons, such especially as have charge of large hospitals. There are modest practition-

ers living in remote rural districts who are gifted by Nature with such sagacity and wisdom, trained so well in what is most essential to the practice of their art, taught so thoroughly by varied experience, forced to such manly self-reliance by their comparative isolation, that, from converse with them alone, from riding with them on their long rounds as they pass from village to village, from talking over cases with them, putting up their prescriptions, watching their expedients, listening to their cautions, marking the event of their predictions, hearing them tell of their mistakes, and now and then glory a little in the detection of another's blunder, a young man would find himself better fitted for his real work than many who have followed long courses of lectures and passed a showy examination. But the young man is exceptionally fortunate who enjoys the intimacy of such a teacher. And it must be confessed that the great hospitals, infirmaries, and dispensaries of large cities, where men of well-sifted reputations are in constant attendance, are the true centres of medical education. No students, I believe, are more thoroughly aware of this than those who have graduated at this institution. Here, as in all our larger city schools, the greatest pains are taken to teach things as well as names. You have entered into the inheritance of a vast amount of transmitted skill and wisdom, which you have taken, warm, as it were, with the life of your well-schooled instructors. You have not learned all that art has to teach you, but you are safer practitioners to-day than were many of those whose names we hardly mention without a genuflection. I had rather be cared for in a fever by the best-taught among you than by the renowned Fernelius or the illustrious Boerhaave, could they come back to us from that better world where there are no physicians needed, and, if the old adage can be trusted, not many within call. I had rather have one of you exercise his surgical skill upon me than find myself in the hands of a resuscitated Fabricius Hildanus, or even of a wise Ambroise Paré, revisiting earth in the light of the nineteenth century.

You will not accuse me of underrating your accomplishments. You know what to do for a child in a fit, for an alderman in an apoplexy, for a girl that has fainted, for a woman

in hysterics, for a leg that is broken, for an arm that is out of joint, for fevers of every color, for the sailor's rheumatism, and the tailor's cachexy. In fact you do really know so much at this very hour, that nothing but the searching test of time can fully teach you the limitations of your knowledge.

Of some of these you will permit me to remind you. You will never have outgrown the possibility of new acquisitions, for Nature is endless in her variety. But even the knowledge which you may be said to possess will be a different thing after long habit has made it a part of your existence. The *tactus eruditus* extends to the mind as well as to the finger-ends. Experience means the knowledge gained by habitual trial, and an expert is one who has been in the habit of trying. This is the kind of knowledge that made Ulysses wise in the ways of men. Many cities had he seen, and known the minds of those who dwelt in them. This knowledge it was that Chaucer's Shipman brought home with him from the sea:

> "In many a tempest had his berd be shake."

This is the knowledge we place most confidence in, in the practical affairs of life.

Our training has two stages. The first stage deals with our intelligence, which takes the idea of what is to be done with the most charming ease and readiness. Let it be a game of billiards, for instance, which the marker is going to teach us. We have nothing to do but to make this ball glance from that ball and hit that other ball, and to knock that ball with this ball into a certain cæcal *sacculus* or *diverticulum* which our professional friend calls a pocket. Nothing can be clearer; it is as easy as "playing upon this pipe," for which Hamlet gives Guildenstern such lucid directions. But this intelligent *Me*, who steps forward as the senior partner in our dual personality, turns out to be a terrible bungler. He misses those glancing hits which the hard-featured young professional person calls "carroms," and insists on pocketing his own ball instead of the other one.

It is the *un*intelligent *Me*, stupid as an idiot, that has to try a thing a thousand times before he can do it, and then never knows how he does it, that at last does it well. We

have to educate ourselves through the pretentious claims of intellect, into the humble accuracy of instinct, and we end at last by acquiring the dexterity, the perfection, the certainty, which those masters of arts, the bee and the spider, inherit from Nature.

Book-knowledge, lecture-knowledge, examination-knowledge, are all in the brain. But work-knowledge is not only in the brain, it is in the senses, in the muscles, in the ganglia of the sympathetic nerves—all over the man, as one may say, as instinct seems diffused through every part of those lower animals that have no such distinct organ as a brain. See a skilful surgeon handle a broken limb; see a wise, old physician smile away a case that looks to a novice as if the sexton would soon be sent for; mark what a large experience has done for those who were fitted to profit by it, and you will feel convinced that, much as you know, something is still left for you to learn.

May I venture to contrast youth and experience in medical practice, something in the way the man painted the lion, that is, the lion under?

The young man knows the rules, but the old man knows the exceptions. The young man knows his patient, but the old man knows also his patient's family, dead and alive, up and down for generations. He can tell beforehand what diseases their unborn children will be subject to, what they will die of if they live long enough, and whether they had better live at all, or remain unrealized possibilities, as belonging to a stock not worth being perpetuated. The young man feels uneasy if he is not continually doing something to stir up his patient's internal arrangements. The old man takes things more quietly, and is much more willing to let well enough alone. All these superiorities, if such they are, you must wait for time to bring you. In the mean while (if we will let the lion be uppermost for a moment), the young man's senses are quicker than those of his older rival. His education in all the accessory branches is more recent, and therefore nearer the existing condition of knowledge. He finds it easier than his seniors to accept the improvements which every year is bringing forward. New ideas build their nests in young men's

brains. "Revolutions are not made by men in spectacles," as I once heard it remarked, and the first whispers of a new truth are not caught by those who begin to feel the need of an ear-trumpet. Granting all these advantages to the young man, he ought, nevertheless, to go on improving, on the whole, as a medical practitioner, with every year, until he has ripened into a well-mellowed maturity. But, to improve, he must be good for something at the start. If you ship a poor cask of wine to India and back, if you keep it half a century, it only grows thinner and sharper.

You are soon to enter into relations with the public, to expend your skill and knowledge for its benefit, and find your support in the rewards of your labor. What kind of a constituency is this which is to look to you as its authorized champions in the struggle of life against its numerous enemies?

In the first place, the persons who seek the aid of the physician are very honest and sincere in their wish to get rid of their complaints, and, generally speaking, to live as long as they can. However attractively the future is painted to them, they are attached to the planet with which they are already acquainted. They are addicted to the daily use of this empirical and unchemical mixture which we call air, and would hold on to it as a tippler does to his alcoholic drinks. There is nothing men will not do, there is nothing they have not done, to recover their health and save their lives. They have submitted to be half-drowned in water, and half-choked with gases, to be buried up to their chins in earth, to be seared with hot irons like galley-slaves, to be crimped with knives, like cod-fish, to have needles thrust into their flesh, and bonfires kindled on their skin, to swallow all sorts of abominations, and to pay for all this, as if to be singed and scalded were a costly privilege, as if blisters were a blessing, and leeches were a luxury. What more can be asked to prove their honesty and sincerity?

This same community is very intelligent with respect to a great many subjects—commerce, mechanics, manufactures, politics. But with regard to medicine it is hopelessly ignorant and never finds it out. I do not know that it is any

worse in this country than in Great Britain, where Mr. Huxley speaks very freely of "the utter ignorance of the simplest laws of their own animal life, which prevails among even the most highly-educated persons." And Cullen said before him: "Neither the acutest genius nor the soundest judgment will avail in judging of a particular science, in regard to which they have not been exercised. I have been obliged to please my patients sometimes with reasons, and I have found that any will pass, even with able divines and acute lawyers; the same will pass with the husbands as with the wives." If the community could only be made aware of its own utter ignorance, and incompetence to form opinions on medical subjects, difficult enough to those who give their lives to the study of them, the practitioner would have an easier task. But it will form opinions of its own, it cannot help it, and we cannot blame it, even though we know how slight and deceptive are their foundations.

This is the way it happens: Every grown-up person has either been ill himself or had a friend suffer from illness, from which he has recovered. Every sick person has done something or other by somebody's advice, or of his own accord, a little before getting better. There is an irresistible tendency to associate the thing done, and the improvement which followed it, as cause and effect. This is the great source of fallacy in medical practice. But the physician has some chance of correcting his hasty inference. He thinks his prescription cured a single case of a particular complaint; he tries it in twenty similar cases without effect, and sets down the first as probably nothing more than a coincidence. The unprofessional experimenter or observer has no large experience to correct his hasty generalization. He wants to believe that the means he employed effected his cure. He feels grateful to the person who advised it, he loves to praise the pill or potion which helped him, and he has a kind of monumental pride in himself as a living testimony to its efficacy. So it is that you will find the community in which you live, be it in town or country, full of brands plucked from the burning, as they believe, by some agency which, with your better training, you feel reasonably confident had nothing to do with it. Their

disease went out of itself, and the stream from the medical fire-annihilator had never even touched it.

You cannot and need not expect to disturb the public in the possession of its medical superstitions. A man's ignorance is as much his private property, and as precious in his own eyes, as his family Bible. You have only to open your own Bible at the ninth chapter of St. John's Gospel, and you will find that the logic of a restored patient was very simple then, as it is now, and very hard to deal with. My clerical friends will forgive me for poaching on their sacred territory, in return for an occasional raid upon the medical domain of which they have now and then been accused.

A blind man was said to have been restored to sight by a young person whom the learned doctors of the Jewish law considered a sinner, and, as such, very unlikely to have been endowed with a divine gift of healing. They visited the patient repeatedly, and evidently teased him with their questions about the treatment, and their insinuations about the young man, until he lost his temper. At last he turned sharply upon them: "Whether he be a sinner or no, I know not: one thing I know, that, whereas I was blind, now I see."

This is the answer that always has been and always will be given by most persons when they find themselves getting well after doing any thing, no matter what—recommended by anybody, no matter whom. Lord Bacon, Robert Boyle, Bishop Berkeley, all put their faith in panaceas which we should laugh to scorn. They had seen people get well after using them. Are we any wiser than those great men? Two years ago, in a lecture before the Massachusetts Historical Society, I mentioned this recipe of Sir Kenelm Digby for fever and ague: Pare the patient's nails, put the parings in a little bag, and hang the bag round the neck of a live eel, and place him in a tub of water. The eel will die, and the patient will recover.

Referring to this prescription in the course of the same lecture, I said: "You smiled when I related Sir Kenelm Digby's prescription, with the live eel in it, but, if each of you were to empty his or her pockets, would there not roll out from more than one of them a horse-chestnut, carried about as a

cure for rheumatism?" Nobody saw fit to empty his or her pockets, and my question brought no response. But two months ago I was in a company of educated persons, college graduates every one of them, when a gentleman, well known in our community, a man of superior ability and strong common-sense, on the occasion of some talk arising about rheumatism, took a couple of very shiny horse-chestnuts from his breeches-pocket, and laid them on the table, telling us how, having suffered from the complaint in question, he had, by the advice of a friend, procured these two horse-chestnuts on a certain time a year or more ago, and carried them about him ever since; from which very day he had been entirely free from rheumatism.

This argument, from what looks like cause and effect, whether it be so or not, is what you will have to meet wherever you go, and you need not think you can answer it. In the natural course of things some thousands of persons must be getting well or better of slight attacks of colds, of rheumatic pains, every week, in this city alone. Hundreds of them do some thing or other in the way of remedy, by medical or other advice, or of their own motion, and the last thing they do gets the credit of the recovery. Think what a crop of remedies this must furnish, if it were all harvested!

Experience has taught, or will teach you, that all the wonderful stories patients and others tell of sudden and signal cures are like Owen Glendower's story of the portents that announced his birth. The earth shook at your nativity, did it? Very likely, and—

> "So it would have done,
> At the same season, if your mother's cat
> Had kittened, though yourself had ne'er been born."

You must listen more meekly than Hotspur did to the babbling Welshman, for ignorance is a solemn and sacred fact, and, like infancy, which it resembles, should be respected. Once in a while you will have a patient of sense, born with the gift of observation, from whom you may learn something. When you find yourself in the presence of one who is fertile of medical opinions, and affluent in stories of marvellous cures—of a

member of Congress whose name figures in certificates to the value of patent medicines, of a voluble dame who discourses on the miracles she has wrought or seen wrought with the little jokers of the sugar-of-milk globule-box, take out your watch and count the pulse; also note the time of day, and charge the price of a visit for every extra fifteen, or, if you are not very busy, every twenty minutes. In this way you will turn what seems a serious dispensation into a double blessing, for this class of patients loves dearly to talk, and it does them a deal of good, and you feel as if you had earned your money by the dose you have taken, quite as honestly as by any dose you may have ordered.

You must take the community just as it is, and make the best of it. You wish to obtain its confidence; there is a short rule for doing this which you will find useful—*deserve it.* But, to deserve it in full measure, you must unite many excellences, natural and acquired.

As the basis of all the rest, you must have all those traits of character which fit you to enter into the most intimate and confidential relations with the families of which you are the privileged friend and counsellor. Medical Christianity, if I may use such a term, is of very early date. By the oath of Hippocrates, the practitioner of ancient times bound himself to enter his patient's house with the sole purpose of doing him good, and so to conduct himself as to avoid the very appearance of evil. Let the physician of to-day begin by coming up to this standard, and add to it all the more-recently discovered virtues and graces.

A certain amount of natural ability is requisite to make you a good physician, but by no means that disproportionate development of some special faculty which goes by the name of genius. A just balance of the mental powers is a great deal more likely to be useful than any single talent, even were it the power of observation, in excess. For a mere observer is liable to be too fond of facts for their own sake, so that, if he told the real truth, he would confess that he takes more pleasure in a *post-mortem* examination which shows him what was the matter with a patient, than in a case which insists on getting well and leaving him in the dark as to its nature. Far more

likely to interfere with the sound practical balance of the mind is that speculative, theoretical tendency which has made so many men noted in their day, whose fame has passed away with their dissolving theories. Read Dr. Bartlett's comparison of the famous Benjamin Rush with his modest fellow townsman Dr. William Currie, and see the dangers into which a passion for grandiose generalizations betrayed a man of many admirable qualities.

I warn you against all ambitious aspirations outside of your profession. Medicine is the most difficult of sciences and the most laborious of arts. It will task all your powers of body and mind if you are faithful to it. Do not dabble in the muddy sewer of politics, nor linger by the enchanted streams of literature, nor dig in far-off fields for the hidden waters of alien sciences. The great practitioners are generally those who concentrate all their powers on their business. If there are here and there brilliant exceptions, it is only in virtue of extraordinary gifts, and industry to which very few are equal.

To get business a man must really want it, and do you suppose that when you are in the middle of a heated caucus, or half-way through a delicate analysis, or in the spasm of an unfinished ode, your eyes rolling in the fine frenzy of poetical composition, you want to be called to a teething infant, or an ancient person groaning under the griefs of a lumbago? I think I have known more than one young man whose doctor's sign proclaimed his readiness to serve mankind in that capacity, but who hated the sound of a patient's knock, and as he sat with his book or his microscope felt exactly as the old party expressed himself in my friend Mr. Brownell's poem—

"All I axes is, let me alone."

The community soon finds out whether you are in earnest, and really mean business, or whether you are one of those diplomaed dilettanti who like the amusement of *quasi* medical studies, but have no idea of wasting their precious time in putting their knowledge in practice for the benefit of their suffering fellow-creatures.

The public is a very incompetent judge of your skill and knowledge, but it gives its confidence most readily to those

who stand well with their professional brethren, whom they call upon when they themselves or their families are sick, whom they choose to honorable offices, whose writings and teachings they hold in esteem. A man may be much valued by the profession and yet have defects which prevent his becoming a favorite practitioner, but no popularity can be depended upon as permanent which is not sanctioned by the judgment of professional experts, and with these you will always stand on your substantial merits.

What shall I say of the personal habits you must form if you wish for success? Temperance is first upon the list. Intemperance in a physician partakes of the guilt of homicide, for the muddled brain may easily make a fatal blunder in a prescription and the unsteady hand transfix an artery in an operation. Tippling doctors have been too common in the history of medicine. Paracelsus was a sot, Radcliffe was much too fond of his glass, and Dr. James Hurlbut, of Wethersfield, Connecticut, a famous man in his time, used to drink a square bottle of rum a day, with a corresponding allowance of opium to help steady his nerves. We commonly speak of a man as being the worse for liquor, but I was asking an Irish laborer one day about his doctor, who, as he said, was somewhat given to drink. "I like him best when he's a little that way," he said—"then I can spake to him." I pitied the poor patient who could not venture to allude to his colic or his pleurisy until his physician was tipsy.

There are personal habits of less gravity than the one I have mentioned which it is well to guard against, or, if they are formed, to relinquish. A man who may be called at a moment's warning into the fragrant boudoir of suffering loveliness, should not unsweeten its atmosphere with reminiscences of extinguished meerschaums. He should remember that the sick are sensitive and fastidious, that they love the sweet odors and the pure tints of flowers, and if his presence is not like the breath of the rose, if his hands are not like the leaf of the lily, his visit may be unwelcome, and if he looks behind him he may see a window thrown open after he has left the sick-chamber. I remember too well the old doctor who sometimes came to help me through those inward griefs to which childhood is

liable. "Far off his coming"—shall I say "shone," and finish the Miltonic phrase, or leave the verb to the happy conjectures of my audience? Before him came a soul-subduing whiff of ipecacuanha, and after him lingered a shuddering consciousness of rhubarb. He had lived so much among his medicaments that he had at last become himself a drug, and to have him pass through a sick-chamber was a stronger dose than a conscientious disciple of Hahnemann would think it safe to administer.

Need I remind you of the importance of punctuality in your engagements, and of the worry and distress to patients and their friends which the want of it occasions? One of my old teachers always carried two watches, to make quite sure of being exact, and not only kept his appointments with the regularity of a chronometer, but took great pains to be at his patient's house at the time when he had reason to believe he was expected, even if no express appointment was made. It is a good rule; if you call too early, my lady's hair may not be as smooth as could be wished, and, if you keep her waiting too long, her hair may be smooth, but her temper otherwise.

You will remember, of course, always to get the weathergage of your patient. I mean, to place him so that the light falls on his face and not on yours. It is a kind of ocular duel that is about to take place between you; you are going to look though his features into his pulmonary and hepatic and other internal machinery, and he is going to look into yours quite as sharply to see what you think about his probabilities for time or eternity.

No matter how hard he stares at your countenance, he should never be able to read his fate in it. It should be cheerful as long as there is hope, and serene in its gravity when nothing is left but resignation. The face of a physician, like that of a diplomatist, should be impenetrable. Nature is a benevolent old hypocrite; she cheats the sick and the dying with illusions better than any anodynes. If there are cogent reasons why a patient should be undeceived, do it deliberately and advisedly, but do not betray your apprehensions through your tell-tale features.

We had a physician in our city whose smile was commonly

reckoned as being worth five thousand dollars a year to him, in the days, too, of moderate incomes. You cannot put on such a smile as that any more than you can get sunshine without sun; there was a tranquil and kindly nature under it that irradiated the pleasant face it made one happier to meet on his daily rounds. But you can cultivate the disposition, and it will work its way through to the surface—nay, more—you can try to wear a quiet and encouraging look, and it will react on your disposition and make you like what you seem to be, or at least bring you nearer to its own likeness.

Your patient has no more right to all the truth you know than he has to all the medicine in your saddle-bags, if you carry that kind of cartridge-box for the ammunition that slays disease. He should get only just so much as is good for him. I have seen a physician examining a patient's chest stop all at once, as he brought out a particular sound with a tap on the collar-bone, in the attitude of a pointer who has just come on the scent or sight of a woodcock. You remember the Spartan boy, who, with unmoved countenance, hid the fox that was tearing his vitals beneath his mantle. What he could do in his own suffering you must learn to do for others on whose vital organs disease has fastened its devouring teeth. It is a terrible thing to take away hope, even earthly hope, from a fellow-creature. Be very careful what names you let fall before your patient. He knows what it means when you tell him he has tubercles or Bright's disease, and, if he hears the word carcinoma, he will certainly look it out in a medical dictionary, if he does not interpret its dread significance on the instant. Tell him he has asthmatic symptoms, or a tendency to the gouty diathesis, and he will at once think of all the asthmatic and gouty old patriarchs he has ever heard of, and be comforted. You need not be so cautious in speaking of the health of rich and remote relatives, if he is in the line of succession.

Some shrewd old doctors have a few phrases always on hand for patients that will insist on knowing the pathology of their complaints without the slightest capacity of understanding the scientific explanation. I have known the term "spinal irritation" serve well on such occasions, but I think nothing on the whole has covered so much ground, and meant so little,

and given such profound satisfaction to all parties, as the magnificent phrase "congestion of the portal system."

Once more, let me recommend you, as far as possible, to keep your doubts to yourself, and give the patient the benefit of your decision. Firmness, gentle firmness, is absolutely necessary in this and certain other relations. Mr. Rarey with Cruiser, Richard with Lady Ann, Pinel with his crazy people, show what steady nerves can do with the most intractable of animals, the most irresistible of despots, and the most unmanageable of invalids.

If you cannot acquire and keep the confidence of your patient, it is time for you to give place to some other practitioner who can. If you are wise and diligent, you can establish relations with the best of them which they will find it very hard to break. But, if they wish to employ another person, who, as they think, knows more than you do, do not take it as a personal wrong. A patient believes another man can save his life, can restore him to health, which, as he thinks, you have not the skill to do. No matter whether the patient is right or wrong, it is a great impertinence to think you have any property in him. Your estimate of your own ability is not the question, it is what the patient thinks of it. All your wisdom is to him like the lady's virtue in Raleigh's song:

> "If she seem not chaste to me,
> What care I how chaste she be?"

What I call a good patient is one who, having found a good physician, sticks to him till he dies. But there are many very good people who are not what I call good patients. I was once requested to call on a lady suffering from nervous and other symptoms. It came out in the preliminary conversational skirmish, half medical, half social, that I was the *twenty-sixth* member of the faculty into whose arms, professionally speaking, she had successively thrown herself. Not being a believer in such a rapid rotation of scientific crops, I gently deposited the burden, commending it to the care of number twenty-seven, and him, whoever he might be, to the care of Heaven.

If there happened to be among my audience any person who wished to know on what principles the patient should

choose his physician, I should give him these few precepts to think over:

Choose a man who is personally agreeable, for a daily visit from an intelligent, amiable, pleasant, sympathetic person will cost you no more than one from a sloven or a boor, and his presence will do more for you than any prescription the other will order.

Let him be a man of recognized good sense in other matters, and the chance is that he will be sensible as a practitioner.

Let him be a man who stands well with his professional brethren, whom they approve as honest, able, courteous.

Let him be one whose patients are willing to die in his hands, not one whom they go to for trifles and leave as soon as they are in danger, and who can say, therefore, that he never loses a patient.

Do not leave the ranks of what is called the regular profession, unless you wish to go farther and fare worse, for you may be assured that its members recognize no principle which hinders their accepting any remedial agent proved to be useful, no matter from what quarter it comes. The difficulty is that the stragglers, organized under fantastic names in pretentious associations, or lurking in solitary dens behind doors left ajar, make no real contributions to the art of healing. When they bring forward a remedial agent like chloral, like the bromide of potassium, like ether, used as an anæsthetic, they will find no difficulty in procuring its recognition.

Some of you will probably be more or less troubled by the pretensions of that parody of mediæval theology which finds its dogma of hereditary depravity in the doctrine of *psora*, its miracle of transubstantiation in the mystery of its triturations and dilutions, its church in the people who have mistaken their century, and its priests in those who have mistaken their calling. You can do little with persons who are disposed to accept these curious medical superstitions. The saturation-point of individual minds with reference to evidence, and especially medical evidence, differs, and must always continue to differ, very widely. There are those whose minds are satisfied with the decillionth dilution of a scientific proof. No

wonder they believe in the efficacy of a similar attenuation of bryony or pulsatilla. You have no fulcrum you can rest upon to lift an error out of such minds as these, often highly endowed with knowledge and talent, sometimes with genius, but commonly richer in the imaginative than the observing and reasoning faculties.

Let me return once more to the young graduate. Your relations to your professional brethren may be a source of life-long happiness and growth in knowledge and character, or they may make you wretched and end by leaving you isolated from those who should be your friends and counsellors. The life of a physician becomes ignoble when he suffers himself to feed on petty jealousies and sours his temper in perpetual quarrels. You will be liable to meet an uncomfortable man here and there in the profession—one who is so fond of being in hot water that it is a wonder all the albumen in his body is not coagulated. There are common barrators among doctors as there are among lawyers—stirrers up of strife under one pretext and another, but in reality because they like it. They are their own worst enemies, and do themselves a mischief each time they assail their neighbors. In my student-days I remember a good deal of this Donnybrook-Fair style of quarrelling, more especially in Paris, where some of the noted surgeons were always at loggerheads, and in one of our lively Western cities. Soon after I had set up an office, I had a trifling experience which may serve to point a moral in this direction. I had placed a lamp behind the glass in the entry to indicate to the passer-by where relief from all curable infirmities was to be sought and found. Its brilliancy attracted the attention of a devious youth, who dashed his fist through the glass and upset my modest luminary. All he got by his vivacious assault was that he left portions of integument from his knuckles upon the glass, had a lame hand, was very easily identified, and had to pay the glazier's bill. The moral is that, if the brilliancy of another's reputation excites your belligerent instincts, it is not worth your while to strike at it, without calculating which of you is likely to suffer most, if you do.

You may be assured that when an ill-conditioned neighbor

is always complaining of a bad taste in his mouth and an evil atmosphere about him, there is something wrong about his own secretions. In such cases there is an alterative regimen of remarkable efficacy: it is a starvation-diet of letting alone. The great majority of the profession are peacefully inclined. Their pursuits are eminently humanizing, and they look with disgust on the personalities which intrude themselves into the placid domain of an art whose province it is to heal and not to wound.

The intercourse of teacher and student in a large school is necessarily limited, but it should be, and, so far as my experience goes, it is, eminently cordial and kindly. You will leave with regret, and hold in tender remembrance, those who have taken you by the hand at your entrance on your chosen path, and led you patiently and faithfully, until the great gates at its end have swung upon their hinges, and the world lies open before you. That venerable oath to which I have before referred bound the student to regard his instructor in the light of a parent, to treat his children like brothers, to succor him in his day of need. I trust the spirit of the oath of Hippocrates is not dead in the hearts of the students of to-day. They will remember with gratitude every earnest effort, every encouraging word, which has helped them in their difficult and laborious career of study. The names they read on their diplomas will recall faces that are like family-portraits in their memory, and the echo of voices they have listened to so long will linger in their memories far into the still evening of their lives.

One voice will be heard no more which has been familiar to many among you. It is not for me, a stranger to these scenes, to speak his eulogy. I have no right to sadden this hour by dwelling on the deep regrets of friendship, or to bid the bitter tears of sorrow flow afresh. Yet I cannot help remembering what a void the death of such a practitioner as your late instructor must leave in the wide circle of those who leaned upon his counsel and assistance in their hour of need, in a community where he was so widely known and esteemed, in a school where he bore so important a part. There is no exemption from the common doom for him who holds

the shield to protect others. The student is called from his bench, the professor from his chair, the practitioner in his busiest period hears a knock more peremptory than any patient's midnight summons, and goes on that unreturning visit which admits of no excuse, and suffers no delay. The call of such a man away from us is the bereavement of a great family. Nor can we help regretting the loss for him of a bright and cheerful earthly future; for the old age of a physician is one of the happiest periods of his life. He is loved and cherished for what he has been, and even in the decline of his faculties there are occasions when his experience is still appealed to, and his trembling hands are looked to with renewing hope and trust, as yet able to stay the arm of the destroyer.

But, if there is so much left for age, how beautiful, how inspiring is the hope of youth! I see among those whom I count as listeners one by whose side I have sat as a fellow-teacher, and by whose instructions I have felt myself not too old to profit. As we borrowed him from your city, I must take this opportunity of telling you that his zeal, intelligence, and admirable faculty as an instructor were heartily and universally recognized among us. We return him, as we trust, uninjured to the fellow-citizens who have the privilege of claiming him as their own.

And now, gentlemen of the graduating class, nothing remains but for me to bid you, in the name of those for whom I am commissioned and privileged to speak, farewell as students, and welcome as practitioners. I pronounce the two benedictions in the same breath, as the late king's demise and the new king's accession are proclaimed by the same voice at the same moment. You would hardly excuse me if I stooped to any meaner dialect than the classical and familiar language of your prescriptions, the same in which your title to the name of physician is, if, like our own institution, you follow the ancient usage, engraved upon your diplomas.

Valete, JUVENES, *artis medicæ studiosi; valete, discipuli, valete, filii!*

Salvete, VIRI, *artis medicæ magistri; salvete, amici; salvete, fratres!*

ART. IV.—*On the Influences of Non-specific Emanations on the Public Health: Are they deleterious?* By WM. C. ROBERTS, M. D., Vice-President New York Academy of Medicine.

CHEERFULLY admitting the great noisomeness of these public nuisances, I design, in this paper, to consider, as candidly as I can, and as derived from recognized authorities, their pestilential influences in a scientific point of view.

In a paper read before the Academy in a former year, I endeavored to show that noisome smells, or effluvia, or fetid emanations from various sources, both of animal and vegetable decomposition, or the gases which produce these smells, or in which they resided, were not necessarily, and in all cases, injurious to the health of individuals, nor communities; and fortunate it is that it is so; that, except under certain circumstances, they did not engender disease, nor were pestilential, nor detrimental to health, and that their importance in this respect had been overrated; and that, when non-specific, however offensive, they were for the most part innocuous.

In certain idiosyncrasies, when intense, they do occasionally induce nausea, vomiting, diarrhœa, cholera-morbus, dysentery even, and fever of a typhoid type, acting partly through the brain and nervous system, partly through the blood.

In some recorded instances, several persons residing in the same limited space, and exposed equally to these emanations—say in a school, or an asylum—had been similarly attacked, and deaths even had occurred among them; but the diseases so produced were neither specific nor contagious, and were limited in extent to the locality. I endeavored to show that in the filthiest and most fetid streets in this metropolis, Orange, Baxter, Mott, Mulberry, and Elizabeth, and others, where the air reeked with the tainted odors of slaughter-houses, etc., the inhabitants did not suffer in a greater degree than those of others, and adduced other instances of the comparative salubrity of persons engaged in offensive manufactures.

No one can doubt that a gas, or a concentration of gases, incapable of supporting life, must be deleterious and deadly to persons inhaling them, without inhaling at the same time a sufficient amount of oxygen to counteract their noxious influ-

ence; that they produce syncope, or sudden or slow asphyxia; but they are rendered innocuous by their speedy and general diffusion in the air, and thus, offensive as they are, are greatly shorn of their morbific influences. Such an atmosphere, however, is not one that would be selected either for health or pleasure, and the propriety of their removal cannot be questioned.

Not long ago, while small-pox was prevailing very extensively in the city, on both sides, I had occasion to pass down West Thirty-second Street, between the Seventh and Eighth Avenues, which was encumbered with masses of festering filth, and stunk as offensively, I think, as any streets I have ever passed through; yet the case-book of the Board of Health did not show that any special susceptibility to the prevailing endemic existed in this locality, nor in many other streets as filthy, as compared with wide and comparatively cleanly thoroughfares. To the instances of the correctness of this view, which I have already cited (see *Bulletin of Academy*), I desire to add some others with which my reading has furnished me, whereby the true influences of noxious emanations may be rightly appreciated.

In the *British Medical Journal*, vol. ii., p. 356, 1864, the reader will find a brief report of the annual meeting of the British Association for the Advancement of Science, at Bath, Eng., September, 1864. On this occasion Dr. J. Hughes Bennett laid down for debate and discussion the following propositions:

1. Atmospheric air strongly impregnated with odors of different kinds was *not necessarily injurious to health*. No injury to health had been shown to result from an establishment in Paris for the distribution of manure; and the condition of the river Thames had not been productive of the slightest effect on the health of London. Naples is a very volcanic neighborhood, and the drains throw off large quantities of sulphuretted hydrogen, which emit a most offensive odor. Yet Naples is not more subject to typhoid fever than any other city. The hospitals were stinking and filthy, yet no fever was caused in that way. The most pestiferous fevers prevail endemically in places where there are no bad smells,

and are not attributable to such causes. Carburetted hydrogen, which has no smell, is as deleterious as sulphuretted hydrogen, which smells very badly. The smell of the water of Leith will "knock down the deil;" but it is not pretended that any person had suffered inconvenience from the bad smell, and its banks were the healthiest parts of the city. "Smells," said Dr. B., "as smells, were neither injurious to health nor were they a nuisance to those who lived among them. They became accustomed to them, and may even learn to like them, though this is not universal." Dr. B. goes on to say that the deleterious gases arising from effluvia were only injurious by being carried into the blood, and to this end they must be sufficiently concentrated, and the atmospheric air proportionately diminished. The fish in all rivers are not destroyed by sewage. Some, as birds on carrion, and pigs and eels on garbage, grow fat on it. Typhoid fever cannot be proved to originate from the fermentation of sewerage-water. There were not wanting some coincidences respecting drains; but there were innumerable cases of emanations that had never caused epidemics, to counterbalance those on the other side. Epidemics have not been diminished by costly drainage, as is seen in Paris. In Edinburgh, old town, there was, until lately, no drainage, and typhoid fever is unknown there. Dr. Livingstone, the distinguished African explorer, believed it was most important to know that stinks were not the causes of fever in Africa. He stopped with his suite all night at a place down the Nyamzi, where the water, as it came out of a marsh, was as black as ink, and had a most abominable smell, turning the paint on the ships white, etc. This phenomenon did not produce illness in the crews, nor was it known to do so among the natives. It would, he said, be a great mistake to suppose that fevers came from the presence of bad smells. Dr. Kirk said that in similar localities in Africa there were never any serious fevers. Dr. McAdam gave a modified opinion, but said that bad smells were not necessarily injurious, and that chemists lived in the midst of sulphuretted hydrogen, and without experiencing any ill effects from it. But other injurious things, not isolated, might be evolved from putrefying matters after, or without sulphuretted hydrogen. He quite admitted

that there were other causes than drainage affecting the mortality and general health of the people.

Dr. William Budd believed that Dr. Bennett was entirely right in laying it down as a fundamental principle that foul gases had no power to generate fever; the sewers never generated the fevers, nor their poisons, but they distributed them. The specific poisons are eliminated from the bodies of the sick, and carried into the sewers. No doubt, therefore, the process of removal and destroyal of specific exuviæ, before they became cast off and set at large in the community, was proper, and tended to prevent the spread of diphtheria, typhoid fever, and even scarlatina; and he proposed a resolution which might be advantageously laid before the Association on this occasion: "That it is desirable that a committee should be appointed to report to the Association, at some future meeting, whether the specific agent, which is the cause of typhoid fever, be ever generated *de novo* out of common sewage, or whether sewers only propagate this fever by the dissemination of the germ in the liquid evacuations from persons affected with the disease:" which was carried; but whether such report has since been made, I cannot say.

Dr. Richardson said that Dr. Snow, some years ago, pointed out the difference between a bad smell and a poison. So far as this distinction went, he entirely concurred with Dr. Bennett. Dr. Bennett said that he had succeeded in the object he had had in view, which was to provoke discussion. He had never said that bad smells were good things. He disliked them as much as anybody; but the great point he wanted to force forward was, "that this effect of smell upon the health of the public had been greatly exaggerated;" which is entirely my own opinion.

Dr. Parkes ("Manual of Practical Hygiene") thinks that the water drunk is more injurious than the air breathed; he points out the brevity of incubation of typhoid fever, when conveyed by water, as compared with that conveyed by air; he by no means believes that cholera is alone conveyed by drinking-water. Yellow fever may, but no other zymotic disease can, be conveyed in this way. He says, "We now know that, unless the specific cause be present, *no mere foulness of*

air will produce a specific disease;" and adds, most truly, that accurate statistical inquiry, on a large scale, alone can prove what may be in reality a serious depreciation of general health. He shows that, in spite of very free ventilation, the poisons of small-pox and scarlatina will long preserve their power of reproducing the same disease. He believes that sewer-air is productive of mischief, rather of the digestive tube than of the pulmonary system. Without absolutely denying the possibility of the *de novo* origination of typhoid fever from simple sewage matter, he is convinced that sewers afford the channel of communication when containing the specific poison of the stools.

If we examine the papers of that very distinguished epidemiologist, Dr. William Budd, of Bristol, England, in the *British Medical Journal*, 1861, we shall find him a firm asserter of the innocuousness of mere smells, a decided contagionist, and an utter disbeliever in the *possibility of any generation of specific disease de novo*, in which he concurs with Watson and Graves. In the first place, he objects to the term "pythogenic" (typhoid) fever, as a disease born of putrescence, as depending on an untenable theory. It cannot be pure sewage that causes the fever; it must be *sewage of a particular kind.* In North Lawton, severely visited in 1839, there had not been in ten years more than one case of fever; and yet the hypothetical "fever-demon of the sanitarian" stunk as loudly, during that long period of entire exemption, as he did when nearly one-sixth of the whole population was struck down with fever. "If he were not there in person, he surely had no business to smell so badly." This is true generally of places everywhere, and in villages particularly, because of the deficiency of or defect in sewerage; the evacuations of diseased persons are thrown out upon the soil; showing that these impurities have no power of themselves to cause fever, *unless when charged with the specific poison.* These discharges in large cities are quickly swept out of harm's way; in country places they accumulate, day by day, upon the open soil, and envelop the household and the neighborhood. Hence the vital importance of *disinfecting* such exuviæ, of which abundant proofs are furnished in the subsequent paper.

But, of all the striking instances known of the innocuousness of *mere smells*, however offensive, that which may well be called the greatest on modern record, quoted by Dr. Budd, must here be cited. The river Thames, which bisects the city of London, began, in the hot months of 1858 and 1859, to stink loudly. It emitted what Falstaff, after his experience in the buck-basket, called the "rankest compound of villanous smells that ever offended nostrils." It was an epidemic stink, *epi demos*, upon the people. It needed no particular susceptibility for its recognition; not the fastidious delicacy of Hotspur's fop, who complained that a "beggarly, unhandsome corpse should be brought betwixt the wind and his nobility;" nor the keen scent of the amiable and philanthropic Florence Nightingale, who "saw with her eyes, and smelt with her nose," the small-pox, in the course of formation, in the wards of a crowded hospital. It was as palpable to the coster-monger, as he walked beside his donkey, as to the Lord High-Chancellor, in robe of state, seated on the wool-sack. For the first time in the history of man, the sewage of nearly two million people had been brought to seethe and ferment under a burning sun, in one vast *cloaca*, lying in their midst. Stench so foul had never before ascended to pollute this lower air. The committee-rooms of Parliament were rendered habitable only by the use of deodorizers; the law courts were broken up; the river-steamers lost their traffic, and travellers went many miles round, to avoid crossing the bridges. "India is in revolt, and the Thames stinks," were the two great facts, coupled together by a distinguished foreign writer, to mark the climax of a national humiliation. Pestilence, cholera, and fever, were loudly predicted by persons of all classes; a case of malignant cholera did occur in the person of a Thames waterman, and was the key-note of a general alarm. But, did it occur? Were these dire anticipations, so naturally and confidently ascertained, realized? On the contrary, the health of the metropolis remained remarkably good; and fever, diarrhœa, and dysentery, which last two might certainly have been expected, diminished in comparison with the preceding year. Dr. McWilliams, a water-side supervisor, says: "The stench from the river and docks was in nowise pro-

ductive of disease, however noisome; on the contrary, there was less of that form of disease to which foul emanations are supposed to give rise than usual."

Of two places in like sanitary conditions, one may be the seat of virulent fever, and the other, perhaps the worse of the two, remain perfectly free. Exbourn, four miles from North Tawton, was the filthiest of places in the same season, and escaped; but afterward a low fever *was imported*, and spread virulently, when it had died out in Tawton. This is the history of small-pox, measles, scarlatina, and cholera; *the same alternations of slumber and activity, of prevalence in certain places; the same successive invasion of neighboring places.* The *specific morbid cause, always existing*, is transmissible from place to place, breeds as it goes (zymosis), and then dies out, or becomes dormant, without leaving any sign to mark its track or existence, until again awakened into activity. Diseases so engendered are essentially contagious. "To conclude," says Dr. Budd, "on the evidence usually assigned for such a belief, that specific poisons, possessing the habitudes that belong to their history, are bred in every cesspool, or ditch, in which there is seething rottenness, or decomposition, is akin to the ancient belief that mushrooms are bred of cow-dung, alligators of the mud of the Nile, or bees, as Virgil sung, out of the entrails of a putrid ox; and signs are not wanting to show that the time is not far distant when the belief in question will take its place in that limbo of discarded fallacies to which these other superstitions have long been consigned."

Since, then, it seems very clear, from what has preceded, that mere stenches, from whatever cause proceeding, or however vile, offensive, and concentrated, are injurious only in a few limited instances, in persons of very susceptible organizations, in whom they produce certain forms of gastro-intestinal disturbance, and cannot be said in any general sense to be pestilential, injurious to health, or detrimental to life, it follows that all that is necessary in the case of gas-houses, fat-melting, bone-burning establishments, slaughter-houses, and such other stench generators as are public nuisances, is, that they should be removed from the midst of populously-inhabited neighborhoods, and *deodorized*, to render them generally perfectly in-

nocuous. Sewers and cesspools, etc., because they *may* contain, besides the mere elements of decomposition and fetor, materials, derived from human excreta, holding in themselves the specific poison of disease, and susceptible of zymotic reproduction, and a contagious principle, which may diffuse emanations capable of propagating and extending pestilence over a very wide extent of surface, as many recorded examples show, should be not only deodorized, but *disinfected* as well.

All this, I am proud to say, has been done daily for years past, to a very great extent, as their annual reports will show, by the late liberal and enlightened Metropolitan Board of Health, under the supervision of its former energetic and scientific sanitary superintendent, and will be continued, I do not doubt, under his worthy successor in office.

In this way only can threatened pestilence be excluded, its spread when existent limited, its seeds destroyed, and its multiplication arrested. Such has been, to my certain knowledge, during the past year, the effect of measures devised in a spirit of true philanthropy and zeal for the public health and safety, and carried out energetically with the aid of all well-recognized resources of sanitary science, sequestration, cleansing, and *disinfection.*

Clinical Records from Private and Hospital Practice.

I.—*Report of Cases of Croup. Supplementary to Article in the July*, 1870, *number* New York Medical Journal. By J. H. Hobart Burge, M. D., Brooklyn, N. Y.

The following account of a most remarkable case is sent to me by my friend Dr. George A. Ostrander, of No. 2 Greene Avenue, Brooklyn, in whose practice it occurred:

Monday, February 21*st.*—Called to see Michael M., aged seven years; has been complaining since Saturday last of hoarseness, with an occasional cough. The breathing is decidedly croupy, skin nearly natural, pulse same; bowels have been moved to-day. Ordered ipecac. and tart. antim., alternated with half-grain doses of hydrarg. sub. mur., and to paint the throat with iodine till sore.

Tuesday, 22*d*.—Pulse more rapid, painful expression of countenance. The medicine has been given faithfully, and he has slept a little during the night. There is no membrane to be seen. Ordered potass. bromide gr. ij every four hours, inhalations of vapor of slacking lime; lime-water spray, alternating with the spray from a solution of carbolic acid. Beef-tea and milk punch frequently.

Wednesday, 23*d*, 8 A. M.—The membrane can now be very plainly seen. Patient passed a very bad night; breathes with excessive difficulty; pulse rapid. Perspiration profuse, very little air enters the right lung.

9 A. M.—Drs. Burge and Corey met me in consultation, and Dr. Burge advised the continuation of the use of the slacking lime. Potass. bromide, ten grains at once, and afterward five grains every four hours; an irritating liniment to the chest, and the occasional inhalation of the steam from carbolic acid and hot water.

2 P. M.—Drs. Burge and Cooper again saw the patient with me. There is no change for the better, but the contrary. Dr. Cooper advised the use of lactic acid, ten drops to ℥ ss. of water, by spray. This, Dr. Cooper says, Dr. Weber, of Hamburg, has used with great success. The same treatment was continued, and the lactic acid ordered.

2 A. M.—The lactic acid has been carefully used by myself, six or eight times, in the last twelve hours, but I can see no effect whatever from it.

24*th*, 8 A. M.—The membrane can be plainly seen, firmly fixed; respiration very difficult, both lungs involved. Pulse 150; passed a sleepless night.

9 A. M.—Dr. Burge again saw the case, and we agreed to discontinue the use of the lactic acid, but to continue the other treatment. Ordered an oil-silk jacket to the chest. Brandy-punch and beef-tea as often as possible. Prognosis most unfavorable.

2 P. M.—Dr. Burge and Dr. Cooper again saw the child. Both lungs apparently so completely filled up that it seemed impossible for the child to live more than one hour or two. Dr. Burge remarking that we could do no more, both gentlemen left.

4 P. M.—Patient still alive, and that is all. There is, however, as yet no cyanosis of the lips, or of the finger-nails. The breathing is short, rapid, and gasping, the alæ of the nose very much distended at each inspiration. Ordered continuance of the slacking lime, beef-tea, and milk-punch.

Friday, 25*th*, 1 A. M.—No change, bowels very loose, some blood in the discharges, child working hard for breath. Continued same treatment.

9 A. M.—Patient still alive, desires to be carried continually. A piece of the false membrane seems to be loose. Endeavored two or three times to grasp it, with a forceps, but failed. Continued same treatment.

Saturday, 26*th*, 9 A. M.—Patient coughed up a piece of the false membrane, and the mother pulled it out of his mouth this morning. No other signs of improvement.

Sunday, 27*th*, 9 A. M.—Can see no false membrane in the throat. But

there is no improvement in any other of the symptoms. The piece of membrane coughed up must have been from the upper part of the trachea, and the rest is still remaining.

Monday, 28*th*, 9 A. M.—Patient seems just a shade stronger. Continued treatment exactly the same.

4 P. M.—Patient decidedly easier; has coughed up more of the false membrane. This time, a piece about five inches long, large enough to admit my little finger, and bifurcated at its extremity to enter the two bronchial tubes, and extending into the latter about one inch. Ordered quinine sulph. gr. ij every four hours, and the other treatment just the same, and, as the child is very restless, a starch and laudanum enema.

Tuesday, *March* 1*st*.—Patient passed a very comfortable night; had short naps, in all slept about an hour. Pulse 140; skin moist. Continued quinine and other treatment.

Wednesday, 2*d*.—Patient improving, begins to take notice. Pulse 140; skin warm and moist. Ordered continuance of treatment, and counter-irritation all over the chest, by weak mustard-plasters under the oiled-silk.

Thursday, 3*d*.—Patient still improving, has some desire for food, and complains of pain in the abdomen. Ordered the same treatment, except the mustard, which was replaced by cotton-batting. Every time he coughs he brings up little pieces of the membrane, and tough, viscid phlegm. From this time the boy continued to improve, the pneumonic symptoms gradually disappearing, and his strength returning until now.

Wednesday, 16*th*.—His mother says he can eat all he can get, and plays around the room nearly all day. His voice has not yet recovered its natural tone. A piece of the false membrane I suspended in the lactic acid (full strength), and, after twenty-four hours, I could see no effect upon it.

[There are some points, in this remarkable case, worthy of notice. The first is, the length of time the child suffered, before any membrane could be perceived. The child had been croupy one whole day before I saw him, and domestic remedies had been used. So it was three days before the membrane was visible. Second, the failure of the lactic acid to give *any* relief, and its failure, in full strength, to affect the membrane after it was thrown off. And third, that relief was afforded *only* by the *persistent* use of the vapor of *slacking lime*. A few pieces of lime were put in a pitcher, and warm water poured on it. A blanket or a newspaper was so thrown over the pitcher as to direct the vapor toward the mouth of the patient, and compel him to breathe as much of it as he possibly could. This was kept up continually day and night, for nine days, only stopping to give him time to drink his punch

or beef-tea. After that, the lime was slacked in a pail, by his bedside.

I should not forget to mention, however, that this child's age and the determined, persistent care with which the directions were carried out were greatly in our favor ; and that it teaches us never to give up while life lasts.—G. A. O.]

In addition to the points of interest specially noticed by Dr. Ostrander, I would call attention to the fact that there was not only an entire absence of the vesicular murmur, but extensive dulness, on percussion, over the base of both lungs.

Again, it is difficult to conceive how a membrane of such character and extent, filling the larynx and trachea, and ramifying into the bronchi, could remain so long *in situ*, without producing fatal suffocation, even if the lung below were perfectly normal ; but when, as in this case, both lungs were much infiltrated, and one almost hepatized, the escape from death seems almost miraculous. I dwell upon these points because there is in them great encouragement to persevere in our efforts, and to urge the friends of our patients to the same diligence, even when there seems no reasonable hope of success. Can it be necessary to remind any one how *little* of harsh treatment it would have required to suffocate this patient, at any time during the five days of his greatest struggle ?

The following letter from Dr. Thomas Wilde is strong encouragement to perseverance in this mild form of treatment:

January 20, 1869, 10 A. M.—Called to see Edward Murphy, aged four years and four months. Found him suffering from croup, which, from the symptoms and history obtained, I diagnosticated membranous. Though patiently looked for, no membrane was discovered. This was his third croupy day. I candidly told the family I believed the child would die. I ordered a drachm of sulphate of zinc to be divided into three powders. One of these to be given in water to induce vomiting, at any time the patient should show symptoms of suffocation. Five drops of muriated tincture of iron to be given every four hours. Water was to be kept constantly boiling in the room, and frequently some to be agitated in a basin near the child's face, that the steam might be inhaled. Milk, with lime-water and beef-tea, to be given freely. The bowels being regular, no treatment was directed to them.

Inasmuch as four cases, which I had previously diagnosticated as membranous, had died, I had lost all confidence in my ability to save any such.

January 21*st.*—Am not disappointed to find my patient worse. No change in treatment.

In the evening attended the regular meeting of the Kings County Medical Society. During the evening some incidental remarks were made by a member, on the curative and tonic effects of tartar-emetic in membranous croup. Dr. Burge remarked that he had not lost a patient from croup in three years. I stated, in reply, that I would lose one that night. I was correct. In this case no membrane was at any time discovered.

January 29*th*, 3 P. M.—Called to the Murphy family, to find James, aged eleven months, suffering from croup. Thinking it hardly fair that Dr. Burge should go any longer without losing a patient from croup, I sent for him at once. Though I believed James would die, every encouragement was given the family, that they might relax no efforts in carrying out Dr. Burge's treatment. A thick deposit was seen on each tonsil, easily scraped off with the spatula. No membrane at any time seen.

January 30*th.*—Patient worse, and to my mind threatening a fatal issue. Dr. Burge not inclined to be discouraged.

January 31*st.*—Remains about the same. Encouraged to persevere in the treatment.

February 1*st.*—Better, though still in a precarious condition.

February 2*d.*—Convalescing. Have some faith in lime, bromide of potash, and hops.

February 18, 1869, 10 A. M.—Called to see Kate Busher, aged four years and one month. Found her suffering from what I diagnosticated membranous or dangerous croup. Dr. Burge at once summoned. Told the doctor I thought he could not succeed again.

Mrs. Busher lost a child, aged one year and six months, in 1861; says Kate acts just like the little boy she lost. Vapor of lime, bromide of potassium, and hops, were directed.

February 19*th.*—Patient much worse. Acute bronchitis complicates the case. Hot hop-poultices ordered to the chest.

February 20*th.*—Patient worse. Appears as though she could survive but a few hours. Treatment persistently adhered to.

February 23*d.*—The child was convalescing. Made a good recovery.

I have had but one case of membranous croup since.

Permit me to add that ordinary cases of spasmodic or light inflammatory croup, where the croupy symptoms subside, or considerably mitigate in the daytime, have never caused me much uneasiness.

I do not now expect to cure all my cases of membranous or dangerous croup, but Dr. Burge has taught me that they may be treated with *hope* of success. I believe firmly that

both of my patients who recovered under Dr. Burge's treatment, and are now pictures of health, would have died had they been treated as directed by some of our standard authorities.—T. W.

II.—*Case of Foreign Body in the Œsophagus, and Death from Abscess.* By Ely Van De Warker, M. D., Syracuse, N. Y.

The following case having excited considerable interest and comment among the professional as well as non-professional public in this vicinity, I submit the minutes of the case to the consideration of the readers of the Journal:

I was called on December 13th, at 5.30 p. m., to see Mrs. Eliza Heartley, aged thirty-six, a resident of Syracuse and a native of Canada; the mother of one child; had also suffered subsequently one miscarriage; of full habit and sanguine temperament. On my arrival I found that the patient had, at supper, at about 4 p. m., swallowed a piece of cartilage, with meat attached, from the brisket of a lamb. Patient described the foreign body as about one inch long and three-eighths of an inch in diameter.

The symptoms were pain and sense of obstruction referred to a point corresponding to upper part of sternum; dysphagia total as regards solids; fluids gave great pain, and were slowly passed in small quantities, with the appearance of great muscular effort; pulse 100; skin moist; expression of face anxious; no difficulty in breathing. I gave ℞. tart. ant. gr. ij, ipecac. grs. xv. M., and procured a free evacuation of the stomach in about half an hour, and apparently without obstruction. Substance still referred to same point. 7.30 p. m.—The foreign body was still felt by the patient, who described it as moving up and receding while vomiting. Gave ten grains of Tully's powder, to repeat the dose if necessary, and with directions to keep her quiet.

December 14th, 10 a. m.—Pain and difficulty in deglutition still present. Pain and obstruction still referred to upper part of sternum. She had made no attempt to swallow solids. Slept some during the latter part of the night, and vomited at intervals. Pulse 95; skin cool and moist. This morning the patient experienced a sharp pain over the spinous process of the first dorsal vertebra. She described it as present from the moment of swallowing the piece of meat, but at first as a mere sense of uneasiness.[1]

A stomach-probang—Dr. G. W. Cook being present—was passed without trouble. On withdrawing the instrument, there was a slight spasmodic resistance on the part of the œsophagus.

[1] I have often remarked a reflex pain at this point, from irritation of the upper portion of the œsophagus.

The patient expressed relief from the obstructing body at once. Fluids *still* gave great pain and difficulty in swallowing. She refused to attempt to swallow solids. Patient informed me she had not urinated since afternoon of the 13th. On examination found the bladder full. ℞. Pil. assafœt. gr. ii., every two hours; evacuated the bladder at 12 M. There was no difficulty in respiration or articulation.

December 15*th.*—I did not see the patient, as the husband desired me not to come unless called. The husband made his report at the office during the evening, stating that the symptoms were still the same. ℞. Chloral hydrate, grs. xxv. at a dose.

December 16*th.*—Was asked to see patient this A. M. Symptoms of obstruction the same. Bowels constipated. Urine passed freely. Had a chill with febrile reaction early this A. M. Pulse 100. Has not swallowed any solids. Neuralgic pain in the teeth and lower jaw. Expectoration streaked with blood. The chloral procured about five hours' quiet sleep last night. Warm fomentations to throat and chest.

December 17*th.*—The husband again procured chloral from the office, and described patient as the same.

December 20*th.*—For the first time since the 16th I was called to see the case, at 4.30 P. M. Found patient had just recovered from a severe attack of dyspnœa. Pulse 120. Respirations 20. Breathing stridulous, with a somewhat croupy cough. Expectoration frothy and slightly streaked with blood. On auscultation, a dry, loud, tubular râle, heard more distinctly over the right lung, and completely masking the respiratory murmur. ℞. Tart. ant. grs. ij, ipecac. grs. xv, aquæ ℥ ij, Misce et signa, Teaspoonful doses as an antispasmodic and expectorant. Sinapism applied to chest. On swallowing a teaspoonful of the expectorant mixture, dyspnœa again came on, but not so severe as at first. On close examination of the throat, I detected a slight bulging of the sterno-cleido-mastoideus muscle, uniform on both sides, and with no perceptible sense of fluctuation. The fauces and pharynx appeared shining and pale.

Dr. W. Y. Plant called in consultation. Facts elicited as above. Directed emplas. canthar., six by four inches, under the right clavicle in place of sinapism, 7 P. M. Breathing became much easier, bronchial râle lessened in intensity, so that vesicular murmur could be heard. She spoke with difficulty in a dry, hard whisper. Dysphagia still present. Patient died at 11.45 P. M., from a severe attack of dyspnœa.

Sectio Cadaveris.—December 24*th*, 9 P. M., fifty-seven hours after death. Present Drs. Plant, Dallas, Wheedon, Cook, and Fairchild.

External Appearances.—Rigor mortis well marked; body well nourished and muscular; expression of face natural; no discharge from mouth or nose. The bulging under the mastoideus muscles, referred to in above clinical history, not so marked as when living.

Thorax and abdomen on section showed thick layer of adipose.

Cavity of Thorax.—Heart normal in size and muscular development. Cavity of pericardium contained about half an ounce of yellowish serum.

Right auricle and ventricle filled by tarry fluid blood. Left auricle and ventricle contained dark fluid blood. Tarry fluid blood escaped from the aorta on section. Lungs—upper lobes streaked by congestion. Lower lobes and posterior surfaces engorged by *post-mortem* gravitation of blood. Pulmonary vessels on section exuded dark fluid blood. Larger bronchial tubes at root of right lung were dissected out, and laid open; surface generally pale, with a few patches of congested mucous membrane, limited in extent; surface covered with tenacious mucus containing minute bubbles of air. Neck—the trachea was exposed by an incision extending to upper portion of the thyroid cartilage, and was laid open up to that point; mucous membrane pale and showing on its surface a few engorged vessels and covered with mucus, containing small air-bubbles. The finger, passed up to the rima glottidis, showed its edge free from œdema or obstruction, and well defined. On dissecting out the œsophagus in the cervical region, thick, creamy pus welled up from an incision made on the left of the œsophagus from an abscess situated posterior to it. Thoracic and cervical portion of the œsophagus gave evidence, on its interior lining, of recent inflammatory action, beginning at a point corresponding to third dorsal vertebra, the walls being thickened and darkly congested. On dissecting and removing the œsophagus, at a point opposite the middle of the thyroid cartilage, the cavity of a large abscess was brought into view. The cavity of the abscess reached from about the last four cervical vertebræ above, to the first two dorsal vertebræ below, and was bounded posteriorly by the longus colli, laterally by the deep cervical fascia and muscles, and anteriorly by the œsophagus. The cavity of the abscess would contain about four fluidounces.

Remaining portion of the œsophagus and stomach removed and laid open, and appeared healthy. Cavity of stomach contained only about an ounce of thick, dark-colored fluid. No pus. No foreign body found. Liver normal; spleen normal. No further examination of cavity of abdomen. Head not examined.

Note.—It is proper to say that many gentlemen belonging to the Syracuse Medical Society, on listening to the minutes of the case, expressed the opinion that it was a case of idiopathic abscess. There are features in the history given which render that opinion difficult to establish. I have endeavored to give the case in detail, to enable your readers to form their own opinion.

The imports of drugs and chemicals into New York City, for the year 1870, amounted, according to the *Journal of Applied Chemistry*, to $17,511,316. Opium heads the list with $1,691,417.

Proceedings of Societies.

MEDICAL SOCIETY OF THE COUNTY OF NEW YORK.

Stated Meeting, March 6, 1871.

Dr. Abram Jacobi, President, in the chair.

The President announced the admission to membership of Drs. Lucius D. Bulkley, Mark H. Williams, and Hermann Gulecke.

The report of the Committee on Intelligence was read by Dr. Castle; that of the Committee on Meteorology by Dr. Goodwillie; and that of the Committee on Diseases by Dr. Raborg.

SCROFULA: ITS RELATION TO TUBERCULOSIS, ETC.

Dr. J. Lewis Smith read a paper upon this subject, of which we present a brief abstract:

Scrofulous inflammations differ from others in being attended by greater cell-formation; by being especially liable to end in suppuration; and in being very commonly subacute and chronic. Scrofula is a disease of infancy and childhood, though early manhood is not exempt. The diathesis is most active before the age of fifteen years, and after the age of twenty its manifestations are infrequent.

The scrofulous diathesis may be either congenital or acquired.

Parents who have exhibited its symptoms in early life, and later have remained cachectic, are apt to beget scrofulous children. Consanguinity of the parents is commonly considered as a cause of the affection, but probably upon no solid foundation. There is no doubt that bad hygienic influences surrounding the mother during gestation, and especially her insufficient or improper nourishment, may render the child scrofulous.

Acquired scrofula may generally be traced to some depressing cause sufficient to produce the peculiar change in the molecular condition of the tissues. Insufficient breast-milk, or

milk of poor quality, like that furnished after protracted lactation; poor diet after weaning; residence in damp and filthy streets or apartments; or in small and crowded apartments, even with personal cleanliness and good diet, are among the causes. The various eruptive fevers may either produce it, or render active the diathesis before latent. In this city chronic entero-colitis is perhaps the most frequent of all causes affecting infancy.

Is scrofula contagious or communicable? No one believes in its infectiousness; but there is a prevalent notion in favor of its communicability by contact, and some authorities are inclining to support it. It presents no analogy, however, to the diseases we know to be thus communicable, and in all probability it ought not to be classed among them. It may perhaps be proved, by-and-by, to be communicable by inoculation. Vaccination affords the best opportunity of testing this point; and there is certainly a very wide-spread popular belief that this is often the vehicle by which the diathesis is conveyed to the previously healthy. Such a belief, when it has reference to a diathesis characterized by clear external manifestations, ought to merit some respect. Now, it is the almost unanimious opinion, of those whose experience entitles them to a hearing upon this matter, that pure vaccine lymph never communicates anything but vaccinia; and that, whenever any thing else is communicated, it is by means of blood carelessly mixed with the lymph in its removal. This opinion commends itself by its reasonableness, as well as by the results of experience. But, when scrofulous subjects are vaccinated, the sore, like any other slight wound in such subjects, is apt to take on an inflammatory action, to suppurate, and to cause swelling of the connected lymphatic glands. If the scab from such a sore is used to inoculate a healthy child, it may produce inflammation, from the products of inflammation it contains. Again, scrofulous manifestations may appear for the first time after vaccinia, but not oftener than after the other eruptive diseases—small-pox, measles, scarlatina, etc. It is probably the vaccinia itself, and not the inoculation of scrofulous material, which thus sometimes gives rise to the affection. We know that, where a diathesis exists, the slightest occasions are often

sufficient to bring it to light—a scratch may call forth erysipelas, a slight exposure, rheumatism, etc.

With reference to the anatomical characters of scrofula, but slight changes have been observed in the blood. Its red corpuscles are diminished in number, and lose a part of their coloring matter. The white corpuscles are multiplied, according to Virchow, as long, and only as long, as the irritated glands retain something of their functional power. Scrofula must be regarded as quite distinct from leucæmia, which Niemeyer tells us is a disease of adult life.

The chief anatomical change in the glands is an increased production of lymph-cells, that of the stroma being subordinate. This hyperplasia of the glands is sometimes primary, oftener secondary to inflammation propagated along their lymphatic vessels—for example, from a cutaneous eruption. In non-strumous subjects such an inflammatory swelling of the glands soon subsides; but in the strumous it is more persistent. The enlarged glands may become cheesy; and they are always liable to become freshly inflamed and to suppurate. Or the swelling may disappear, probably by fatty degeneration, liquefaction, and absorption. Calcification is a rare occurrence.

The diathesis is observed under two widely-different types: the one marked by the tall, slender form; thin, transparent skin; bright eye, with clear, bluish sclerotic; small muscles; quick perceptions and intellect; the other marked by a torpid habit, with large flabby muscles; much adipose tissue; prominent belly; thick upper lip; thick, flat nose, etc. Between the two are all gradations.

The most common strumous inflammations affect the skin, mucous membrane, connective tissue, bones, periosteum, eye, and ear. We have no space to follow their description in detail.

Chronic inflammations of the joints, like morbus coxæ, etc., while commonly considered strumous, are by some authorities strenuously denied to be so. The difference of opinion would seem to come from a different understanding of the nature of scrofula. Those who hold hip-disease to be non-strumous, believe scrofula and tubercle identical. If they would define

scrofula as simply a diathesis in which the tissues are easily wounded, there would be no further conflict about the scrofulous character of the joint-affection.

Scrofulous subjects are perhaps no more liable than others to inflammation of the internal organs, but the products of inflammation are more apt to become cheesy. Pneumonia, for example, often involves grave consequences in those decidedly scrofulous. Instead of becoming resolved and absorbed, its products form cheesy deposits, ending in consumption and death. This is so common that cheesy pneumonia has sometimes been called scrofulous pneumonia.

The relation of scrofula to tuberculosis has attracted much attention, some holding strongly to their identity, others as strongly denying it.

We must admit that the cells which we find so multiplied in scrofulous hyperplasia of the lymphatic glands are the same in character as the cells of the tubercle; in other words, the physiological type of the tubercle-cell is the lymph-cell. But in scrofula these cells are found only in the glands, while in tuberculosis they appear not only in these but in various tissues throughout the system. Moreover, in the gland itself their mode of production is different in the two cases. In strumous hyperplasia the lymph-cells are multiplied by segmentation of the cells physiologically belonging to the gland; in tubercle they are produced from nuclei in the connective tissue of the gland.

In the fact that tubercle is often produced by cheesy matter conveyed to the lungs we find a similarity to scrofula.

Parents affected with syphilis and other cachexiæ are apt to bequeath scrofula to their children, but not tubercle. Consanguineous marriages oftener give rise to scrofula than to tubercle, as they should, since the former is the more prevalent

Scrofula appears early in life, tubercle later, as a rule. Bouchut, indeed, holds that tubercle is only the manifestation of the most advanced stage of scrofula, corresponding, for instance, to the tertiary lesions in syphilis. But we may have tubercle in infants.

Recent investigations tend to show that tubercle is less a diathesis than formerly supposed, and than scrofula is admitted

to be. Tubercle is often the result of local causes, where there was no previous diathesis, while in the causation of scrofulous ailments the diathesis always plays a prominent part.

Scrofula simply modifies ordinary physiological or pathological processes. In tuberculosis there occurs in the affected tissue a pathological process quite peculiar; there is produced in the connective tissue a cell which never otherwise occurs there.

The prognosis in scrofula depends much on the patient's hygienic conditions; as the diathesis may be acquired from bad conditions, so it may disappear under good ones. With proper treatment the prospect is good in most cases where there are not serious local troubles; but, where these have reached a certain grade of intensity or chronicity, they will leave permanent deformity or impairment of function.

As to treatment, the prophylaxis must begin before birth. Then the infant must be put under the best hygienic conditions, care being taken to avoid every thing which has been mentioned as liable to produce the diathesis.

When the disease has become manifest, the same regimen must be maintained or instituted; the child must have plenty of good food, fresh air, and sunlight, with tonics, if necessary to improve nutrition.

Of special remedies, cod-liver oil is justly lauded in the erethitic type of the disease, but in the torpid type it does little or no good. Children commonly like it. With adults it may derange digestion, and so do harm.

Iodine has much value in the treatment of scrofulous swellings, etc., but it is questionable whether its effect on the diathesis itself is not overrated. It is best administered in its compounds, as iodide of iron, of starch, of potassium, or of sodium: the two former being especially adapted to children—first, because they are apt to be anæmic; the second, because it is so readily decomposed by the digestive and other fluids.

Mercury is harmful, unless where the diathesis is due to syphilis.

The swollen glands are commonly treated with iodine, applied externally as a counter-irritant. In the speaker's experience such irritation only served to cause greater proliferation

of the gland-cells, and to increase, instead of diminishing, the evil. The mode of application should be such as to produce the minimum of irritation with the maximum of absorption into the gland. Good formulæ were: 1. A drachm of the iodide of potassium to the ounce of stramonium, to be rubbed over the gland, but too irritant to be used as a plaster; 2. Equal parts of Lugol's solution and glycerine; 3. An ounce of Lugol's solution to the pint of water, to be kept constantly applied on lint; 4. A solution of iodine and iodide of ammonium in glycerine and alcohol. When the glands become actively inflamed, the iodine applications should be stopped, as only aggravating the trouble. There is no longer any prospect of resolution, and poultices should be applied.

Dr. Stephen Rogers hoped that careful experiments would be made with reference to the development, by vaccination with pure lymph, of active scrofula in persons who had before exhibited only the signs of the dormant diathesis.

Dr. W. C. Roberts reviewed some of the questions relating to the connection of scrofula and tuberculosis, and suggested the course which experiment should take to determine them. He stated that he had expressed the same views more fully in a recent paper before the Academy.

The President, being called upon, said he would speak of a single point. Was scrofula a real diathesis, giving rise to a multitude of symptoms; or was it only a name that we apply to this group of symptoms, which we know not how else to designate collectively? The case of vaccination related by Dr. Smith might illustrate the point. A healthy boy, of healthy parentage, was vaccinated at the age of eleven years, and thereupon developed a sore arm, great and persistent glandular swellings in the axilla and various other parts of the body, and all the symptoms of so-called scrofula. This result was exactly what we so often see in younger children, as the effect of other causes. How many a child of the best stock is perfectly healthy until eight or ten months old; then gets a severe attack of entero-colitis; and then develops all the scrofulous symptoms just described!

When a child dies after the first two or three days of a

severe diarrhœa, we always find a simple hyperæmic swelling of the mesenteric glands, as the result of the hyperæmia of the intestine in their immediate neighborhood. The gland is large, red, and soft. If such a diarrhœa ceases in a few days, the congestion of the gland goes off, along with that of the intestine, and there is certainly no change produced in its structure.

But let the diarrhœa have lasted a long time. Then the gland is found large, as before; yet it is no longer soft, but hard; no longer red, but pale; and the microscope shows a marked anatomical change. The prolonged congestion has given rise to the production of new cells, and these have become transformed into fibres in such abundance as to compress the blood-vessels. Such a gland can never return to its original size; and its nutrition and its functional activity are permanently impaired. These are the glands we find in such numbers in the mesentery after prolonged diarrhœa, and this condition is that known as tabes mesenterica.

When cells are accumulated in a gland in large numbers, whether mixed with fibres or not, those at the centre, most distant from the nutrient blood-vessels, will undergo decomposition, both from want of nourishment, and from compression by the cells crowding upon them from all sides; that is, we find cheesy degeneration of the gland at its centre. What has been called tubercular degeneration of the mesenteric glands is nothing else than this breaking down of their tissue, consequent upon irritation, hyperæmia, hyperplasia, compression, and innutrition.

So-called scrofula, then, may originate in a simple catarrhal inflammation. It behooves us, therefore, when we see a case of mild diarrhœa, by no means to let it run on as of little importance; for congestion of the intestinal mucous membrane means congestion of the mesenteric glands as well, and if allowed to continue it will assuredly lay the foundation of hyperplasia, and, in all probability, of induration.

One other point I will barely mention. It is an interesting fact that scrofula is seen, apart from the lymphatic glands, only in the various modifications of one sort of tissue. Skin, mucous membrane, bone—all the tissues in which it appears—are transformations of what was originally connective tissue.

Scrofula, then, would seem to be a disease of the connective tissue, rather than of the system generally.

Dr. Peaslee thought it would be well to discard the term scrofula from our nomenclature, since it expressed simply a series of changes with which we were now familiar under other names—such changes, for example, as had just been described by the President.

Dr. Stein thought iodine was often of so little service because it was employed too late.

Dr. Castle said that the late Dr. Whittlesey, who had such a large experience in scrofulous diseases during his long charge of the Nursery Hospital on Randall's Island, was accustomed to exhibit iodine internally alone, and commonly in the form of Lugol's solution, in small doses, largely diluted, and often continued for months. This, with cod-liver oil and careful hygiene, constituted his main treatment.

ELECTION OF TREASURER.

Dr. S. T. Hubbard, who had been elected Treasurer in place of Dr. Bibbins, deceased, declined the office; and Dr. Joseph E. Janvrin was unanimously elected.

RESOLUTIONS ON DEATH OF DR. ELLIOT.

Dr. J. C. Peters, from the committee appointed at the last meeting, to prepare resolutions on the death of Dr. George T. Elliot, reported the following, which were adopted:

Whereas, It has pleased Almighty God, in His inscrutable wisdom, to remove from our midst our late well-beloved President, George T. Elliot, M. D.:

Resolved, That while we submit to the decree of an all-wise Providence with that resignation which is so deeply impressed upon us by the greatness of our affliction, yet we, the members of the Medical Society of the County of New York, must long feel in sorrow that our loss is such as none other can replace.

Resolved, That in Dr. Elliot's sudden seizure—in the prime of his powers; in the zenith of the glory of his reputation and usefulness; amid the pressure of his enthusiastic labors, both public and private, scientific and practical, benevolent and professional—we recognize true martyrdom to humanity and science.

Resolved, That by his great and varied talents, by his high and inflexible moral qualities, and by his enthusiasm for all that is scientifically true and

practically useful, he has shed great lustre on our Society, both at home and abroad.

Resolved, That we will keep fresh the memory of his bright example, and treasure the results of his arduous work and solid achievements, of his brilliant teachings and successful leadership, of his sagacious counsellings and ripe scholarship; while we must always linger with pleasure upon the recollection of his mingled dignity and suavity, his rare good-will and winning grace of manner, his genial companionship and devoted friendship.

Resolved, That we deeply sympathize with his bereaved family and with all his friends; and that we will cordially unite with them in durably preserving the record of his labors, talents, and virtues.

Resolved, That these resolutions be published in the medical journals of this city, and that a copy be transmitted to his family.

Dr. Peters stated that there was still a very small deficit in the subscription for the purchase of Dr. Elliot's library, and its donation to the Medical Library and Journal Association. He was sure that the members of this Society would be glad of the opportunity to coöperate with those of the sister association, and with the Faculty of the Bellevue Hospital Medical College, in placing in a public position, where it would be so eminently useful, such a monument of the profound and varied scholarship of our departed friend.

RESOLUTIONS ON DEATH OF DR. DRAKE.

Dr. Van Kleek, appointed to prepare resolutions on the death of Dr. Benjamin Drake, presented the following, which were adopted:

Resolved, That the Medical Society of the County of New York has learned with sincere regret of the death of Dr. Benjamin Drake, a former President of the Society.

Resolved, That the Society bears in grateful remembrance the interest ever felt by the late Dr. Drake in its prosperity, and his efforts for its promotion, especially in its days of darkness and gloom.

Resolved, That in Dr. Drake we recognized an accomplished and skilful physician, a scientist of marked and varied attainments, a gentleman in bearing, and a man of the honesty that marks "the noblest work of God."

Resolved, That we tender to the family and friends of the deceased our sympathy in their bereavement, while trusting that their sorrow may be lightened by remembrance of his worth.

Resolved, That these resolutions be entered upon the minutes of the Society, and that a copy of the same, duly signed by the President and Secretary, be furnished to his family.

SEVERE CHEST-WOUND: RECOVERY.

Dr. John Ellis Blake introduced to the Society Colonel George N. Lewis, of the Twelfth Connecticut Volunteers. This gentleman was wounded before Port Hudson, in May, 1863, by a grape-shot, which, having been deflected by the limb of a tree, and made to take a downward course, struck the patient upon the superior surface of the clavicle, fracturing this bone; thence, passing through the apex of the right lung, in a direction downward, backward, and toward the median line of the body, emerged from the chest near the third dorsal vertebra, and in contact with the spinal column; thence under the skin across the spine, to a point near the fifth dorsal vertebra and on the left side, whence it was removed, on the field of battle, by an incision through the skin made by the brigade surgeon. The portions of bone removed from the track of the ball, at different times, by Dr. Blake, having unfortunately been destroyed through the carelessness of an attendant, it was difficult now to say precisely what they were. They were believed, by those who saw them, to be fragments of some of the superior ribs and some transverse vertebral processes.

Dr. Sands, who had once seen the patient, gave his impression of the probable course of the ball, and the probable lesions produced.

Dr. Benjamin Howard remarked that, notwithstanding the great mortality attending wounds of the chest, there were on record many remarkable cases of recovery. A case very like the one just described was reported by Dr. Blanton, of Kentucky. A grape-shot, and, as afterward discovered, a brass button also, penetrated the left breast, perforated the lung, and fractured the posterior portion of the fifth rib, both foreign bodies lodging between the fractured end of the rib and the spine. So great was the havoc made, that the fractured end of the posterior portion of the rib could be seen from the anterior wound. Yet this patient recovered, became fatter than ever, and lived sixteen months.

In the Hunterian Museum might be seen a preparation, the history of which is, that the patient was transfixed through the chest by the shaft of a carriage, the end of which entered several inches into the stable wall, to which it pinned him.

He helped to draw himself off the shaft, finally recovered, had moderate health, and lived eleven years.

In both of these cases the autopsies revealed consolidation and great atrophy of the affected lung, with firm and extensive adhesions, sufficient to almost abolish its function.

Respecting the lodgment of missiles in the lung-tissue, Dr. Howard thought that, although a case had been reported where a ball was found in the lung fifty years after the injury, yet recovery in such cases was much rarer than after far greater apparent damage without lodgment of the offending body.

Dr. Chamberlain had seen a remarkable case of thoracic injury on the day after the battle of Antietam. The outer third of the clavicle, the coracoid process, and a portion of the spine, of the scapula, and a part of the head of the humerus, had been carried away *en masse* by some large missile. He could look down into the cavity of the pleura and see the collapsed lung. The man was suffering intense dyspnœa, and the speaker supposed, of course, that he had speedily died. But, three or four years later, he was astonished by the man's appearing before him, to be examined for a pension. He got the maximum allowance.

THEORY OF CURE OF ULCERS BY SKIN-GRAFTING.

Dr. Benjamin Howard presented a patient the calf of whose leg had been carried away by a cannon-shot, more than seven and a half years ago. This officer had been under treatment ever since, by different surgeons in this country and in Europe; but cicatrization of the wound, on reaching a certain point, had halted, and refused to proceed further. Less than a month since, Dr. Howard, who had been invited to witness Reverdin's operation by Prof. Hamilton, had transplanted into the ulcer two pieces of skin about the size of a grain of rice, and at subsequent periods three other pieces, the last two being larger than the others. The wound, which less than four weeks ago was over four inches long, and about an inch and a quarter wide, was seen to have greatly diminished in size.

The most noticeable points in the progress of this case were:

1. All the grafts united completely and at once. This, the speaker thought, was promoted by the use of a sharp knife in their removal, and in the formation of a bed for them to lie in.

2. The epithelial surface of the smaller grafts had slowly sloughed.

3. The two which were considerably larger than the rest had shown no such tendency.

4. Growth from the grafts had taken place only in the case of one of them, the latest and the largest.

5. The cicatrization had taken place almost exclusively from the circumference of the wound toward the nearest grafts respectively.

Concerning the theory of the process of repair but little had as yet been offered. While watching this case, the speaker had been led to ask himself how it came to pass that the cicatrization excited by these grafts did not proceed by continuity from the grafts themselves, but was rather induced in the distant edges of the wound, and chiefly at points opposite the grafts. From these points arches of new tissue were thrown to the graft, as a central pier, and thus were formed bridges of cicatricial tissue across the wound. He had read the various reports on this subject, and had observed that, whatever other differences of opinion there may be, all seem united on this—epithelial cells in the graft are an essential element of success. To aid in determining the correctness of this view, he had conceived the experiment of ingrafting a tissue which should contain no epithelium. Therefore, finding a few days since that the reparative action in the wound seemed to be arrested, he, with the assistance of Dr. Hinton, had exsected a piece of muscle from the middle of the biceps of the patient's arm, cut it into three pieces, about the size of the skin-grafts before used, and implanted them in the ulcer, just as those had been implanted. On examination twenty-four hours afterward, each piece was found completely and firmly adherent in the bed cut for it, and was level with the surrounding surface. The whole surface of the wound had already taken on a new action, and covered itself with florid granulations. The edges had shared the fresh impulse; and even a part of the ulcer

completely cut off from that portion where the muscle-grafting was made, by a bridge of cicatricial tissue, had felt the same stimulus and begun afresh the process of healing. From this moment the progress of the cicatrization had been as marked as when the skin-grafts were employed.

The doctor wished to inquire whether the acceleration of the process of repair, so noticeable in the original margins of the ulcer, might not be due less to the *quality of the tissue* introduced than to the *vital process of adhesion* established at a given point in the sluggish wound, which became a centre of increased vitality to the surrounding parts.

Dr. Stein thought the credit apparently due to the muscle-grafts ought to be given to the skin-grafts previously used. He had himself succeeded by simply sprinkling epithelial scales, some of which, doubtless, were not wholly deprived of germinal matter, over the surface of an ulcer.

Dr. A. H. Smith called attention to the recent establishment of a small hospital for infants, under the charge of the Sisters of St. Mary, at 206 West Fortieth Street. It was conducted with the greatest regard to the best hygienic conditions. The medical staff consisted of Drs. Carmalt, Robert Watts, and M. D. Knight.

The meeting adjourned to Monday, March 20th.

Bibliographical and Literary Notes.

Art. I.—*General Surgical Pathology and Therapeutics, in Fifty Lectures. A Text-book for Students and Physicians.* By Dr. Theodor Billroth, Professor of Surgery in Vienna. Translated from the fourth German edition, with the Special Permission of the Author, by Charles E. Hackley, A. M., M. D., Surgeon to the New York Eye and Ear Infirmary, Physician to the New York Hospital, Fellow of the New York Academy of Medicine, etc., etc. New York: D. Appleton & Co., 1871, 8vo, pp. 676.

In this work we have a *résumé* of the views now entertained by the prominent surgical pathologists of Germany,

and which are fast being adopted by the teachers of pathology in our own land. With truth has the translator said in his preface, that though the views of the author "have been floating through the journals for several years past, . . . they are not so fully presented in any book in the English language." To Dr. Hackley, then, belongs the honor of giving this valuable work in a form that is available to all those who speak the English language. How well he has done his part all will acknowledge after having read the work. A better translation than the one before us, we venture to say, could not have been made, and perhaps with but few, very few exceptions, which are pardonable in a work of this character, there is nothing in the translation deserving of any thing but the highest praise. When we say so much for the translator, we are not unmindful of the great credit this volume does to its publishers. Seldom has a book appeared from the American press which can surpass it either as to typography, paper, and beauty of its plates, and Dr. Billroth must congratulate himself that his work is presented to the English profession in so attractive a form.

In the introductory chapter the author treats of the relation of surgery to internal medicine, and the necessity of the physician being acquainted with both; and in the remarks upon this subject he says: "In short, the surgeon can only judge safely and correctly of the state of his patient when he is at the same time a physician." After some interesting historical remarks, he closes by giving his views as to the proper mode of studying surgery. These will be found as applicable to, and worthy of, being followed by the American student, as those for whose special benefit they were written. In speaking of local anæsthetics, our author appears not to have met with the success that is claimed for it by many, and believes its application would always be limited, and not free from danger, on account of the "freezing of the artificially-cooled portion of skin." In speaking of the treatment of wounded arteries, we think our author is inclined too much to transgress a rule long held as a cardinal one in surgery, namely, to tie the vessel at the seat of the wound. When he says, "If you think you can expose the artery in the wound

without enlarging it much, choose this method as the more certain; but if you consider this very difficult—if at the seat of the wound the artery lies deep under the muscles and fascia, especially in very muscular or fat persons—make a regular ligation of the artery above the wound." By following this latter advice, we fear disastrous effects would result in the majority of cases; and some we can call to mind where just such practice was resorted to.

In regard to acupressure, Dr. Billroth speaks well of it, and in amputation prefers that mode of torsion in the large arteries by passing the needle transversely through the vessel which is drawn forward, rotated until the bleeding is arrested, and then insert the point of the needle into the soft parts. The needle he removes after forty-eight hours, without fear of hæmorrhage.

Referring to the dressing of scalp-wounds, we quite agree with his practice. On this subject he says: "There are many articles of faith handed down from preceptor to pupil, from one text-book to another; many of them are a sort of Hippocratic traditions, full of practical truth—to these I pay full respect; others are based on accidental observations and consequent judgments; among the latter I class the objection to sutures in scalp-wounds. Reviewing my own experience, I remember more cases of inflammation following wounds where no sutures were introduced than where they were." Should, however, inflammation ensue, the sutures are wisely ordered to be removed at once. With regard to sutures, he says it cannot be denied that suppuration is less likely to follow from the use of metal than silk; yet believes that much depends upon the thickness of the thread, and affirms that fine silk threads cause as little suppuration, and may "heal in" just as well as metal ones. Wire cuts the edges of the wound, he says, just as silk does, if it be very fine. That this accident may be avoided has been fully shown by Dr. Emmet, at the Woman's Hospital, in the use of a round-pointed needle, rather than the one ordinarily in use by surgeons. The views entertained on the management of suppurating wounds we should like to see fully carried out in our own institutions, and we believe the time will soon come when this class of wounds will be freed

from such unnecessary dressings as are here spoken of. On the subject of surgical fever we cannot agree with our author, when he thinks constitutional treatment will avail but little in preventing or cutting short this fever. Here, as in many other topics, we cannot think that the German school are the equals of either the American or English surgeons, as to therapeutics, or management of disease; though in pathology they may have taken the lead. The whole subject of wounds and their treatment is discussed in a full and most interesting way; and much, that is new to the majority of practitioners in their pathology, will be found in the first twelve chapters devoted to this subject. The consideration of fractures and dislocations, as well as diseases of the bones and joints, is treated of in a clear and graphic manner, and according to the views now entertained by the distinguished teachers of the modern school of pathology. On the treatment of simple fractures, the plaster-bandage is highly and very justly spoken of. Indeed, it would appear that scarcely any other method was used by Dr. Billroth in the treatment of these cases, as well as in diseases of the joints, where he desires to maintain perfect rest. We are glad to see him in favor of dressing fractures at once, and not waiting some days before a permanent dressing is applied. On this head he says: "It may be regarded as a rule, that a solid, firm dressing should be applied as early as possible, in all cases of simple subcutaneous fractures of the extremities." Still, with all his good advice on the treatment of fractures and diseases of the joints, our author does not seem to be very conversant with the triumphs that have been obtained through the means of extension and counter-extension. At all events, he does not speak of them in the terms that they deserve. In the operation for the relief of non-union in fractures, after Dieffenbach's method, by introducing ivory pegs into the ends of the bone, he says that, when these pegs are removed after a few weeks, they are eroded at the points where they were in contact with the bone, "while the perforation in which they lay is mostly filled with granulations; occasionally the pegs are not removed; the openings through which they were introduced heal. This proves absolutely that *dead bone*, among which

ivory is to be classed, *may be dissolved and reabsorbed by the growing osseous granulations.*" This contested question is also spoken of in the chapter on diseases of the bones, and his theory of it, treated of while speaking on the formation of callus. In mentioning the different operations that have been resorted to, and are worthy of being adopted, we find no mention made of Dr. Brainerd's operation. Here, as well as elsewhere through the book, it strikes us Dr. Hackley would have done well to have added more notes. Foreign authors are far too prone to pass over in silence the achievements of American surgeons, and Dr. Billroth is not an exception to this rule. In the article on phlegmonous inflammation, while speaking of opening deep-seated abscesses in dangerous localities, we cannot but agree with him in the rule he lays down, that "in such cases we must not plunge a bistoury boldly in, but dissect up layer after layer, till we reach the fluctuating covering of the abscess, . . . so as to avoid hæmorrhage from the deeper parts." Space will not admit of our noticing in full all the subjects treated of in this work; but we cannot close the notice of this interesting book without mentioning the lectures on phlebitis, thrombosis, embolism, as well as septic fever and pyæmia—not forgetting that portion of the work which treats of tumors, and especially sarcoma, as being of peculiar interest.

While we are not prepared to agree *in toto* with the entire pathology of the author, nor to follow his treatment in all cases, believing that though his school may be our instructor in pathology, in therapeutics, at least, we are the superior, we claim that this book, making its appearance at this time and in such an agreeable form, must be regarded as a great addition to our literature; and every one who desires to become acquainted with this portion of our science, treated of in the light of modern pathology, and by this great teacher of surgery, ought at once to procure a copy of this work.

ART. II.—*Saint Thomas's Hospital Reports. New Series*, edited by J. S. BRISTOWE, M. D., W. H. STONE, M. D., W. M. ORD, M. D., A. BERNAYS, Ph. D., and F. LE GROS CLARK, Esq., F. R. C. S. Vol. I. London: MDCCLXX., 8vo, pp. 706.

THE old series of St. Thomas's Hospital Reports contained a large number of valuable papers; the initial volume of the new one is of good promise. After "A short history of old St. Thomas's Hospital," which is interesting and full of quaint things, there follows "Remarks on the Different Forms of Pulmonary Consumption," by Thomas B. Peacock, M. D., the gist of which is contained in these opening sentences:

"It is, I believe, commonly considered that there are few diseases more simple in their character, more easy of detection, and of which the result can more readily be predicted, than pulmonary consumption; and yet, perhaps, it would not be far from true that the very reverse of this is more correct—that there are few diseases which differ more in their features, of which the diagnosis is sometimes more obscure, and the precise prognosis more open to doubt, than those which may be classed, and are generally understood to be embraced, under the general term of pulmonary consumption."

Thus the falsity of the teachings of Laennec, Louis, and their school, which held so long absolute sway over the medical minds of the world, to the great injury, as we believe, of both medicine and mankind, is being gradually ignored, and a more correct pathogeny established in their place, with a more hopeful prognosis, and more rational therapeutics.

There is a very thorough and interesting article "On the Mechanism of Articulate Speech," by Dr. J. S. Bristowe, who also contributes "Observations on the Diseases of the Skin, which are generally supposed to be due to the Growth of Vegetable Parasites," with five plates, illustrating these several fungi. Next is an excellent paper by Mr. Richard Barwell, on "Infantile Paralysis," which is carefully and practically studied. We have "A Clinical Lecture on Retention of Urine in Women," by Robert Barnes, M. D.; a paper "On the Action of Quinine," by Edward Clapton, M. D.; and one "On Wounds of the Heart," by James F. West, F. R. C. S.,

with an analysis of thirty-four cases, showing the period during which the patient survived the injury, which varies from three and a half hours to thirty years. In vol. ii. of the second edition of "Holmes's Surgery" will be found statistical tables of four hundred and fifty-two cases of wounds of the heart and pericardium, taken from Dr. G. Fischer's paper published in Langenbeck's Archives, Bd. ix., p. 571, 1868. He observed that collapse with syncope was the first and most important symptom, and he divides his cases into three series, according to the time this symptom set in. In the eighty-seven cases in which it was recorded, he found—1. Where collapse happened at the time of the injury (thirty), it lasted from two minutes to three hours, and death usually followed from a few minutes to two months, most frequently from the sixth to the tenth day. 2. Where collapse was not immediate, but came on some moments after (thirty-eight), in one of these, the wounded person ran four hundred and fifty steps, another ascended several steps, a third walked one mile and a half. 3. Where collapse came on at a much later stage (nineteen), and where the symptom was due probably to the blood-plug in the wound, and death happened from secondary hæmorrhage. Some cases were going on well for twenty-eight days, when sudden death took place.

One of those mixed and puzzling cases of "Partial Spinal Paralysis with Locomotor Ataxy" is related by Mr. Samuel Solly, with the examination of the spinal cord, by Dr. Lockhart Clarke. Mr. William Allingham, F. R. C. S., gives eleven "Cases of Lumbar Colotomy, with Remarks;" of these, two operated on several years since, one in 1866, and the other 1867, were alive and in fair health; another lived in comfort four years; one survived nineteen months; one died nine months after the operation, from pulmonary phthisis; one lived five months, dying of exhaustion, and one three months and two weeks, much relieved from pain, and dying from exhaustion; two survived eight and nine weeks respectively; and in one the operation had been too recently performed to show any positive result.

Mr. T. Spencer Wells's article "On Operations for the Cure of Vaginal Fistula" covers the whole subject in a few pages.

Mr. Wells thinks that the path for future improvement in the treatment of this class of injuries leads, firstly, to more exact experiments of the relative value of the different materials used for sutures; secondly, to the real value of the catheter in the after-treatment; and, thirdly, to the attempt to cure vaginal fistula without either using instruments or sutures. He writes: "If the edges of a fistula are destroyed by the actual cautery or by caustics, and the granulating surfaces are pressed together by *serre-fines*, I have proved that union may be obtained." In this case, where transverse obliteration of the vagina failed in consequence of hæmorrhage, union took place by the use of nitric acid and of quilled and ordinary sutures, with pressure of the granulating surfaces together by hollow metallic rods fixed by springs like *serre-fines*. The best material for the suture is still a matter of dispute. The success of Sims was attributed by him to the use of metallic wire, especially that made of silver; and it seems to be the only kind that was employed by his pupil, Dr. Emmet. Simon's (of Heidelberg) experiments led him to use fine, twisted, and well-waxed silk, as about as strong as horse-hair. Ulrich, of Vienna, whose success has been very great, prefers fine, smooth hempen twine. Prof. Neugebauer, of Warsaw, after many comparative trials of metallic and silk sutures, has returned to the general use of silver wire. Wagner, of Königsberg, considers iron as preferable, and so did the late Prof. Simpson. Mr. Wells's mind is not yet fully made up; he says his "present feeling is that it matters very little whether smooth, well-waxed silk, or twine, or silver or iron wire is used, success depending far more upon the regular and complete removal of the edges of the fistula, and the accurate adaptation, without tension, of raw surfaces freed from cicatricial tissue, than upon the material used for the suture." He adds that he soon learned that the various clamps, buttons, and bars, devised by Sims, Bozeman, Simpson, and himself, were of no use, and often did harm. Speaking of union of the perinæum after the use of nitric acid, and the application of the quilled suture and the ordinary suture, he says, his experience convinces him "that, when there is much fear of bleeding, or any other objection to the use of cutting instru-

ments, the principle of obtaining granulating surfaces by the use of the cautery or caustics, and of retaining these surfaces in apposition either by suture or some form of *serre-fines*, may be carried out in practice with very encouraging results."

One of the ablest and most practical papers in the volume is entitled "Cases illustrating the Clinical History and Pathology of Effusions of Blood into the Peritonæum, with Special Reference to the So-called Retro-uterine Hæmatocele, by Robert Barnes, M. D." This valuable contribution includes: 1. Cases of rupture of the uterus. 2. Cases of rupture of extra-uterine fœtation cysts. 3. Cases of rupture of diseased ovaries. 4, 5, and 6. Cases of retro-uterine hæmatocele from other causes.

The distinction between *encysted and non-encysted blood effusions* in the peritonæum is shown by contrasting the cases of rupture of the uterus, of rupture of extra-uterine gestation-cysts, of rupture of an ovarian tumor, with cases of effusions from abortion and menstrual disturbances. "The first great fact that strikes us is, that when the effused blood does not become encysted, death results; whereas, when it does become encysted, recovery is the rule. . . . In the first order of cases the failure of the encysting process depends mainly upon the crushing severity of the lesion, and the large quantity of blood poured out in a short time. The shock and anæmia are so great that the patient is killed in perhaps a few hours. There is no rally, no opportunity for throwing out conservative lymph. It seems to me also that, in those cases where the patient survives two or three days, the blood remaining in the vessels is deprived by the shock of its natural power to exude plastic matter. Even when no serious loss of blood occurs, if the injury is great and sudden, the consequent shock seems to retard the establishment of peritonitis. I have seen examples of this in ruptures of ovarian cysts, where the shock alone proved fatal, no peritonitis occurring. On the other hand, where the primary lesion is not very severe, where the blood is poured out gradually and in moderate quantities, insulation by peritonitic effusion takes place quickly."

In cases of rupture of the uterus, tubes, or ovaries, *the source of the blood* is clear enough. But, in cases of abortion and of

menstrual difficulty, it may become a question whether its source is the ovaries, from the Fallopian tubes, or from varices of the broad ligaments, as alleged by Richet, Ollivier (d'Angers), and Tilt. Bernutz asserts that, in cases of hæmatocele from varix, the accident happens not at the menstrual period, but after fatigue, which causes distention of the varix. Dr. Barnes says, "We may admit the possibility of hæmatocele from varix, but observation shows that it is exceedingly rare." He adds: "In the intra-peritoneal effusion supervening on abortion, there can be little reason to doubt that the blood comes from the uterus and tubes. And I think we are justified in concluding that the common source of the blood in cases of menstrual difficulty is the same." On the subject of treatment Dr. Barnes remarks: "Where the uterus is ruptured, gastrotomy, to remove the fœtus and effused blood, should be the rule. In cases of rupture of an ovarian tumor complicating pregnancy, I believe ovariotomy will come to be recognized as the proper course. It may not rescue the patient from the collapse consequent on the injury, but it will give the best chance of recovery by removing a great cause of further mischief. It is a question often discussed, whether gastrotomy is not also indicated in cases of rupture of an extra-uterine gestation cyst. Where the gestation has proceeded several months, so that the fœtus is of considerable size, the expediency of removing it by abdominal incision seems clear. But there is more room for dispute in the rupture of a tubal-cyst under three months gestation." Though the size of embryo is inconsiderable, and the real danger lies in the shock and the extent of the blood-effusion, still the fact of *continuous shock*, the effect of an abiding or progressive injury, and repeated hæmorrhage, and for this reason, he thinks, "it is reasonable to hope that, if by gastrotomy we remove the effused blood, and tie the tube so as to prevent further bleeding, the patient would have a better chance of recovery."

The remaining articles—"Cursory Observations on Lithotomy," by Thomas Carr Jackson, F. R. C. S., "The Causation of Epidemic Disease," by Alfred Carpenter, M. D., "Contribution toward the Surgical Treatment of Diseases of the Joints," by Sydney Jones, F. R. C. S., "Delirium Tre-

mens in Surgical Cases," by J. Croft, F. R. C. S., "Cases illustrative of Shock and Visceral Lesions," by Frederick Churchill, M. B., and F. Le Gros Clark, F. R. C. S., and "On the Temperature of Shock in Surgical Cases," by W. W. Wagstaff, F. R. C. S.—call for no special notice, except the last, which is a valuable addition to the study of the body-heat in disease, and goes to prove that, in certain cases, the thermometer is a very useful and essential aid in distinguishing the effect of injury upon the system generally.

A "Report on the Obstetrical Department of St. Thomas's Hospital," by Dr. Henry Gervis, and "Medical and Surgical Statistical Tables," and "Amputation Statistics," by Frederick Churchill, M. D., close the volume. The latter paper shows that during seven years the ratio of deaths was six: primary operations, 1 in 41; secondary, 1 in 2; disease, 1 in 5.5.

Of all the English Hospital Reports, this volume is the most sumptuous in paper and type, and the illustrations are uniformly excellent.

ART. III.—*A Treatise on the Diseases and Surgery of the Mouth, Jaws, and Associate Parts.* By JAMES E. GARRETSON, M. D., D. D. S., late Lecturer on Anatomy and Surgery in the Philadelphia School of Anatomy, etc. Philadelphia: J. B. Lippincott & Co., 1869, 8vo, pp. 700.

THE author might with propriety have entitled this work a complete treatise, for we find here nothing wanting to a perfect understanding of the subjects discussed. The anatomy of the parts, so much as is necessary for a thorough knowledge of the pathology and treatment, is given at the opening of each chapter, so that the possessor of this volume might, without any preliminary study, become a master of the subject. This arrangement will, we are sure, be appreciated by all, but especially by those whose anatomical studies are not of recent date, and who dislike the trouble of referring every few moments to their Gray or Wilson.

Dr. Garretson is the first to give due credit to T. B. Gunning, of this city, for his interdental splint in fractures of the lower jaw. Ashhurst, in his edition of Erichsen, does not

mention this mode of treatment; Wales, in his "Practical Treatise on Surgical Apparatus, Appliances," etc., describes the gutta-percha interdental splint, but completely ignores T. B. Gunning in connection with it. We find it difficult to explain these omissions. That these writers are ignorant of T. B. Gunning's claim to this invention is a supposition hardly to be entertained, but it would be more charitable to accept this hypothesis than to reject it, for a still more unpleasant one would be forced upon us.

The subject of general anæsthesia is treated at length. "Shall we administer chloroform in surgical operations?" is a question which has been asked of late, and one which we think should continue to be asked, till authorities are at one in their answer. It is the duty of every surgeon to investigate the subject for himself, and to give his testimony for or against this anæsthetic. If chloroform is dangerous, and ether less so, is not every operator who uses chloroform for convenience' sake, culpable in putting the life of his patient unnecessarily in danger. We had hoped to find in Dr. Garretson's book something which would help us in settling the question, but we regret that the author's mind is as unsettled as our own. "I certainly do desire heartily to recommend it" (chloroform), he says, and yet upon the same page we read: "At this day it is certainly idle enough to attempt to deny that many deaths have occurred in the use of chloroform, and these accidents have happened not alone in the hands of the charlatan, but the largest proportion of accidents have occurred with most eminent and skilful men, and where every care and scientific precaution possible were taken." Nor does he avoid these "accidents," or at least the danger of them, by using chloroform in alternation with ether, the method he prefers; giving the ether till the pulse rapidly increases or remains fixed and steady, and then substituting chloroform for it.

The treatise contains much that is practical and original. The Latin of the prescriptions needs some revision. The plates are good, and the style in which the book is gotten up is a credit to the publishers. Its chapters on teeth, their abnormalites, diseases, and treatment, render the work particularly valuable to the dentist; and its adoption by several den-

tal colleges will be received as testimony to its value in these branches.

The rhinoplastic, cheiloplastic, and genioplastic operations are illustrated by satisfactory plates, as is also that of tracheotomy.

Art. IV.—*An Essay on the Treatment of Aneurism, with Experiments for the Closure of Arteries by a New Method.* By Benjamin Howard, A. M., M. D., of New York, late Professor of Clinical and Operative Surgery, Long Island Medical College, Fellow of the Royal Medical and Chirurgical Society of London, etc.

This is the essay to which the prize was awarded at the last meeting of the American Medical Association, and one which is of interest, and will well repay the careful attention of all those who may be engaged in the surgical treatment of aneurisms. The essay is divided into three parts. In the first portion, after a reference to the etiology of the disease, the author speaks of the means which are used by Nature to induce a spontaneous cure, and the variety of clots which are found in the aneurismal sac; part second gives the objections to the ordinary silk, tight ligatures, and the dangers resulting therefrom; while the third portion embraces an account of the experiments which the author has made upon the lower animals with metallic ligatures, and the conclusions he has drawn therefrom. These have been from time to time presented, together with the specimens (plates of which are here given), at the New York Pathological Society, and are doubtless familiar to most of our readers. The manner of closing arteries, advocated by the writer, viz., by means of the "constricting silver ligature," is original with Dr. Howard, and one which does him great credit as an original investigator; and it only remains to be seen whether his mode of ligating arteries will be as successful in man as it certainly has been in the experiments upon sheep, which he has detailed.

The deductions which he draws from his investigations are, first, that the "constricting silver ligature" is sufficient to in-

duce permanent closure of an artery; second, that its use is free from destructive inflammation; and third, that the *looseness* of the ligature, as he describes it, *is essential to its permanence.*

ANOTHER "enormous volume" (to quote the language of its treasurer), containing the Transactions of the Twenty-first Annual Meeting of the American Medical Association[1] has been issued, although the same authority states that each volume costs more than the subscription price paid by members. He observes, too, "the Association still continues to vote away, yearly, two hundred dollars for prize essays, thus depleting the treasury and adding to financial embarrassment." In the present instance, however, we think the Association has done well in its appropriation to the author of the prize essay; at least *à titre d'encouragement*, as the French say. It well merits the distinction it received, and we hope that its author, Dr. Benjamin Howard, of New York, will continue to pursue his "Experiments for the closure of arteries by a new method, with special reference to the treatment of aneurism."

With the exception of a paper on "The Physiological Laws of Human Increase," by Nathan Allen, M. D., of Lowell, Mass., and a "Report on the Doctrine of Force, Physical and Vital," by J. H. Watters, M. D., of St. Louis, we think that the other articles, many of them of interest and value, would have been better placed in the medical journals.

We hope to see, at no distant day, a thorough reorganization of the Association, and a volume of Transactions published which will do credit to what should be the representative body of the profession of the United States.

SEVERAL of the articles on the diseases of the nervous system in Reynolds's "System of Medicine" have been reprinted by Mr. Henry C. Lea, under the misnomer of "Diseases of the Spine and Nerves."[2] It is to be regretted that if a reprint of

[1] The Transactions of the American Medical Association. Instituted 1847. Vol. XXI. Philadelphia: printed for the Association. 1870. 8vo, pp. 612.

[2] On Diseases of the Spine and Nerves. By Charles Bland Radcliffe, M. D., John Netten Radcliffe, J. Warburton Begbie, M. D., Francis Ed-

these essays was thought advisable, it was not delayed until the new edition of the second volume of the "System," to be immediately published, had appeared. They do not, in their present state, present, as is claimed in the "Publisher's Note," the latest advances in the knowledge of the several subjects therein discussed. Written, as they were, some years ago, before "the latest advances" in affections of the spinal cord were made public, they therefore do not contain them.

Mr. Jordan's treatise [1] on inflammation contains about one hundred and sixty pages and fifteen plates, showing the proper substances and localities for counter-irritation for the treatment of inflammation. The writer assumes that this process is everywhere the same, and should always be treated on similar principles.

He gives particulars of one hundred and thirty-three cases of various diseases, in which counter-irritation, by tincture, or liniment of iodine, acetum lyttæ, blisters, or the actual cautery, was chiefly or solely relied on.

It would seem as if the advance of medical science fully justified the attempts to generalize treatments and remedies.

Mr. Jordan makes his counter-irritation over the neighboring vascular tract: e. g., in inflammation of the mamma he applies a stripe of iodine-liniment, etc., over the brachial artery; for bubo he applies it over the femoral artery, etc.

Dr. Daremberg, the librarian of the Mazarin Library, has published, in two volumes, a new History of Medicine,[2] which is very highly spoken of in the foreign journals, and which differs from the histories previously published in many important particulars.

Two cardinal principles govern the author's method of

mund Anstie, M. D., and John Russell Reynolds, M. D. Philadelphia: Henry C. Lea, 1870, 8vo, pp. 196.

[1] The Treatment of Inflammation, by Fourneau Jordan, F. R. C. S. London: John Churchill & Sons, 1870, 8vo, pp. 160.

[2] Histoire des Sciences Médicales, comprenant l'Anatomie, la Physiologie, la Médecine, la Chirurgie, et les Doctrines de Pathologie Générales. Par Ch. Daremberg, Professeur chargé du Cours d'Histoire de Médecine du College de France. Paris, 1870.

history. The first is, that the history of the science of medicine cannot be rightly studied apart from the history of the other sciences:

"The radical vice of histories of medicine," he writes, "a vice which has made them all sterile, is that our science has been considered in its totality or its details as an isolated creation, without connections or kinship with other creations of the human mind. . . . To bring the science of medicine back into the circle of the other sciences; to discover a common bond which unites them together, and a common law which explains their progress or their failures—there is the core of history, there is its life."

The second principle laid down is, that diseases are not *entities*, existences, as it were, superadded to the organism. There is a necessary link between the phenomena of health and the phenomena of disease. Morbid productions and disordered functions, subject to vital forces, are equally with these forces governed by regular and positive laws. The recognition of these laws, in their healthy and in their morbid relations, sums up the philosophy of medicine.

Mr. Woodman's pamphlet[1] gives a succinct account of the history of Transplantation; the method of performing the operation, the ordinary precautions necessary, and ends with the notes of nine cases treated in this way. The author warmly advocates transplantation in all cases of obstinate ulcer, as the plan is painless, and can do no harm even if unsuccessful. Of the nine cases mentioned above, eight were successful; the ninth had not at the time of writing improved.

Only a few months since we called attention to the original edition of Dr. Naphey's Hand-book of Therapeutics.[2] It makes its appearance again in an improved and slightly enlarged form. The hold which such books as this have taken upon the profession is too clear an evidence of the popular estimate put upon them, and yet it seems to us there can be

[1] Notes on Transplantation or Engrafting of Skin. By John Woodman, F. R. C. S., etc. London: J. & A. Churchill, 1871, pp. 24.

[2] Modern Therapeutics. A Compendium of Recent Formulæ and Specific Therapeutical Directions. By George H. Napheys, M. D. Second edition, revised and improved. Philadelphia: S. W. Butler, 1871, 12mo, pp. 412.

no doubt that their use should be restricted within narrow limits, or rather hedged in by liberal acquaintance and knowledge of the principles of medicine. The danger is, as we have always maintained, that they are apt to induce and encourage the habit of prescribing by rote, thus making of the physician little more than a mere machine for grinding out prescriptions. Dr. Naphey's book, however, gives the general principles which underlie the treatment of the various diseases, and classes of disease described, and thus in a large degree overcomes the objection just referred to. We can, therefore, confidently recommend the book as perhaps the best, as well as the least likely to do harm, of its class.

We are pleased to notice that Mr. Lippincott has issued a cheap library edition of Dr. Ordronaux's translation of the grand old Regimen of the School of Salernum.[1] Our opinion of the book may be gathered from the lengthy notice of it in the November (1870) number of this Journal. The superb large-paper edition of the book there noticed was too expensive to allow of more than a very limited sale; but now the work is brought within the reach of every one, and we sincerely hope that every classically-educated physician in the country will acquaint himself with this delicious morsel of mediæval medical literature.

Drs. Orton and Spanton have issued an interesting little pamphlet,[2] but of little value in a professional way, especially to us in this country, who have so recently gone through a like experience of hospital organization.

The one idea of Mr. Wolff's pamphlet,[3] is that the various

[1] Regimen Sanitatis Salernitanum: Code of Health of the School of Salernum. Translated into English Verse. With an Introduction, Notes, and an Appendix. By John Ordronaux, LL. B., M. D., Professor of Medical Jurisprudence in the Law School of Columbia College, etc. Philadelphia: J. B. Lippincott & Co., 1871, 12mo, pp. 167.

[2] What we observed during a Visit to the Seat of War, in 1870. By Charles Orton, L. R. C. P., and William Dunnett Spanton, Surgeon, etc. London: J. & A. Churchill (reprinted from the *Lancet*), pp. 39.

[3] The Correlation of Zymotic Diseases. By A. Wolff, F. R. C. S. London: J. & A. Churchill, 1871, pp. 24.

zymotic diseases are due to one poison, a transmitted molecular action, the variety of the disease depending upon the part of the system into which the poison is introduced. In support of the doctrine, however, but feeble proof is adduced.

Dr. Wickham Legg has furnished us with a very convenient little manual,[1] giving sufficient information for the everyday examinations a physician is called upon to make. It is not as complete as the hand-book of Dr. Flint, Jr., lacking the tables and some other matter contained in the latter work.

Dr. Chavasse's previously-published book is too well known to demand any comment here: its wide-spread popularity is sufficient guarantee that it met a want in supplying to mothers a knowledge of the hygiene of infancy and childhood. This sequel[2] is conceived in the same spirit, and will satisfy needs of the same kind.

Georgia again rejoices in a medical journal, the *Georgia Medical Companion*, published at Atlanta, under the editorship of Drs. T. S. Powell and W. T. Goldsmith. The numbers which have reached us are very creditably prepared, and we can only wish the *Companion* every success, and a longer life than was allotted to its predecessors of the same State.

Announcements of New Books.—Macmillan & Co. announce "Dynamics of Nerve and Muscle," by Dr. Charles Bland Radcliffe, well known in this country by his work on "Epilepsy, Pain, and Paralysis," and his contributions to Disorders of the Spinal Cord, in the second volume of Reynolds's "System of Medicine." Though Dr. Radcliffe's views on the physiology and pathology of the nervous system have not been universally accepted, they have always commanded attention by their originality, and their clearness and fairness of statement; and we venture to predict that his forthcoming

[1] A Guide to the Examination of the Urine. For the Practitioner and Student. By J. Wickham Legg, M. D. Philadelphia: Lindsay & Blakiston, 1870, pp. 89.

[2] Counsel to a Mother: being a Continuation and the Completion of "Advice to a Mother." By Pye Henry Chavasse, M. D. Philadelphia: J. B. Lippincott & Co., 1871, pp. 169.

volume will prove at least attractive, and we believe instructive, for the same reasons. The result of his investigations of the interesting subject of the present volume is: that the workings of all kinds of electricity, artificial and natural, upon muscles, are resolvable into charge and discharge: the charge elongating the fibres, and the discharge bringing on contraction. This theory is sustained by the study of *electrotonus*, which is fully gone into. With respect to the problem of sensation, he maintains that the electrometer, rather than the galvanometer, is the instrument which sheds light upon the phenomena to be dealt with. His general view of the dynamics of nerve and muscle may be broadly stated as agreeing with this partial view, and not with the theory which assumes that muscle and nerve have a special life, which expresses itself in contraction, or in sensation, as the case may be.

Messrs. William Wood & Co., of this city, announce: Descriptive and Topographical Anatomy. Translated, with Additions, from the German of Heitzman. 1 vol., imperial 8vo. Over six hundred illustrations, in the finest style of wood engraving.—A Quarterly Journal of New Remedies, Therapeutics, Pharmacy, and Allied Subjects. 8vo. First number, July, 1871.—Stricker's Histology. 1 vol., 8vo, illustrated.—Sir J. Y. Simpson's Works, comprising: I. Select Obstetrics and Gynæcological Works. II. Anæsthesia, Hospitalism, etc. III. Diseases of Women.—A Dictionary of Medicine and Surgery. By a Corps of Eminent Physicians and Surgeons. In twenty-four monthly parts.

Messrs. Lindsay & Blakiston, of Philadelphia, announce: A New Edition of Fuller on Diseases of the Heart; Dickinson's Hand-book of Stomach and Liver Diseases; Corfield's Hygiene; Barfe's Manual of Toxicology; Oldham on Malaria; Williams on Pulmonary Consumption; New Edition of Harris's Dental Surgery; and Rogers's Present State of Therapeutics.

In England, during the year 1870, there were published one hundred and six new works on medicine and surgery. There were also forty-nine new editions, and thirty-eight

American medical publications were imported and put on the market.

The fourth volume of the new edition of Holmes's Surgery has appeared. It contains diseases of the organs of locomotion, of innervation, of digestion, of respiration, and of the urinary organs. One more volume will complete the work.

During the years 1868 and 1869 the number of medical books published in the United States was respectively ninety-seven and eighty-nine. The statement is made that there has been a progressive decrease for some years past.

A selection from the "Familiar Correspondence" of the late Dr. Charles Bell, the great anatomist, has been published by John Murray, of London.

Books and Pamphlets Received.—Third Annual Report of the Board of State Commissioners of Public Charities of the State of New York; to which is appended the Report of the Secretary of the Board. Albany, 1871, pp. 229.

On Dactylitis Syphilitica; with Observations on Syphilitic Lesions of the Joints. By R. W. Taylor, M. D. Pamphlet reprint from the *American Journal of Syphilography*, pp. 30. (From the Author.)

Certificate of Incorporation and By-Laws of the New York Dispensary for Diseases of the Throat and Chest.

Annual Reports of the Physician in Charge and the Treasurer of the New York Dispensary for Diseases of the Throat and Chest.

Miscellaneous and Scientific Notes.

New York Physicians' Mutual Aid Association.—This city has now an organization under the above name and title, whose object is to afford pecuniary aid to the widows and children of its deceased members. In cases of special need aid is also furnished, from the interest of the permanent fund, to its members who may be disabled by sickness. The plan of giving aid is simple, effective, and speedy. It consists merely in levying an assessment of one dollar upon all those members admitted under the age of fifty years, and two dollars upon those over fifty years of age. The moneys so collected

are paid over, without further inquiry, to the legal representatives of the deceased member. Should the circumstances of such representatives preclude the need of aid, and the moneys be returned to the Association, they are invested and become part of the permanent fund. The first donation of this kind was made recently by the widow of the late Dr. Thaddeus M. Halstead, the amount of assessments thus returned being upward of three hundred dollars. Provision has also been made for the care of sick and destitute members, who may, at their option, avail themselves of the comforts and attendance afforded by either of the following-named hospitals, with which arrangements have already been entered into by the trustees to carry out this end, viz.: the New York, German, St. Luke's, Mount Sinai, Roosevelt, Presbyterian, Brooklyn City, and Long Island College Hospitals. Like favor has also been granted by the New York Eye and Ear Infirmary, the Manhattan Eye and Ear Hospital, and the Brooklyn Eye and Ear Hospital.

Altogether the purpose and plan of this organization seem to us the wisest and simplest, and yet most effective, that could be adopted. The Association now numbers about three hundred members, and it is hoped that every physician of good standing in the city and vicinity will become connected with the Society, and thus contribute to the successful issue of so praiseworthy an object.

The Strangers' Hospital.—In alluding to our new charities, we must not omit to mention this splendid institution, which has been erected and equipped by the munificence of a single individual, Mr. Keyser, of this city. This hospital is located at the corner of Avenue D and Tenth Street, a portion of the city far away from the public hospitals, and yet crowded with a population compelled by their poverty largely to rely upon such institutions in case of sickness. The building will accommodate about two hundred patients, and, in its appointments, is certainly one of the completest hospitals in this city. Every thing has been subordinated to the convenience and comfort of the patients, and it is doubtful if there can be found in the country any more perfect provision for ventilation,

heating, and water-supply and waste, than is to be seen here. All this work has been done under the personal, almost constant supervision of the donor, who, besides the expenditures necessitated in the construction and outfit, amounting to upward of one hundred and seventy-five thousand dollars, also provides the means for the current expenses of the institution. Such noble charity as this carries its own reward, and yet none the less on that account ought it to receive the commendation and gratitude of all classes and professions. The attending medical staff consists of Drs. F. N. Otis, T. G. Thomas, H. B. Sands, and William H. Draper, assisted by Drs. R. W. Taylor, James L. Brown, T. T. Sabine, and E. C. Seguin. Dr. Samuel Kennedy is the resident physician. We think we are violating no confidence when we state that much of the admirable and complete arrangement of the institution may be credited to the labors of Dr. Otis, who, during the construction of the hospital, was in almost daily consultations with Mr. Keyser, giving him advice, derived from a large and ripe experience, as to the necessities and proprieties of a hospital building.

A NEW hospital for children has been established in this city, at 206 West Fortieth Street, under the auspices and care of the Sisters of St. Mary of the Episcopal Church. Children of all ages, except those suffering from dangerous contagious diseases, are received and provided for free of expense. The institution is dependent upon charity for its support, and commends itself to the liberality of the public. Drs. F. D. Lente, W. H. Carmalt, and Robt. Watts, are the attending physicians.

Death of Dr. Sheridan Muspratt.—This celebrated chemist recently died in Liverpool. He was a favorite pupil of Liebig, and at the time of his death held the position of Professor of Chemistry in the Liverpool College. He was the author of a Dictionary of Chemistry, and numerous works on the subject. Dr. Muspratt married, some years ago, an American lady, a sister of Miss Charlotte Cushman, the actress, since dead.

DR. WILLIAM KEITH, an eminent surgeon and lecturer, of Aberdeen, who last year visited the United States, is just dead.

He is said to have had a larger experience in lithotomy than any other surgeon of the day. He adopted a modification of Cheselden's operation, and his success was very great. He was a brilliant operator. In conjunction with Dr. Pirrie, he wrote an elaborate work on acupressure.

At a stated meeting of the New York Medical and Surgical Society, held February 25, 1871, the following resolutions were unanimously adopted:

Whereas, Our Heavenly Father has taken from among us our late associate Dr. George T. Elliot.

Resolved, That, in the decease of Dr. Elliot, the members of the New York Medical and Surgical Society are called upon to mourn the loss of a genial companion, a good physician, and a true man. In the prime of his life and usefulness he has been taken.

Resolved, That while *we* mourn a dear friend, the profession at large have lost the counsels of a ripe experience, and the student a teacher of rare ability.

Resolved, That, although dead, his influence survives him, teaching those that remain, that the most enduring fame is that won by unremitting diligence, a constant devotion to the advancement of our noble profession, and a tender care of the sick, the needy, and the destitute.

Resolved, That a copy of these resolutions be preserved in the archives of the Society, and also that a copy, signed by the President and Secretary, be sent to the family of the deceased.

George A. Peters, M. D., } *Committee.*
John T. Metcalfe, M. D., }

On motion it was resolved, that the foregoing resolutions be published in the *Medical Record* and the New York Medical Journal.

Thomas T. Cock, M. D., *President.*

Robert Watts, M. D., *Secretary.*

At a regular meeting of the District Medical Society of the County of Hudson, New Jersey, held at the Jersey City Charity Hospital, February 7, 1871, the following preamble and resolutions were adopted:

Whereas, It has pleased God to remove from his earthly labors our esteemed friend and associate William B. Bibbins, an honorary member of this Society: therefore—

Be it resolved, That while we bow in submission to the Divine will, we deeply deplore the loss of a valued friend.

Resolved, That in his death we are called upon to mourn the loss of an active worker in the cause of medicine, of eminent scholarship, an able adviser, and a good and conscientious man.

Resolved, That a copy of these resolutions be transmitted to the New York medical journals for publication.

B. A. WATSON, M. D., *President*.

J. H. COMFORT, M. D., *Secretary*.

BY the census of 1870 it is ascertained that there are in the United States about seventy-four thousand physicians.

IN the trial of one M. A. A. Wolf, a well-known abortionist, of this city, for inducing abortion, and thereby causing the death of a patient under his charge, the Assistant District Attorney (Mr. Fellows) thus pointedly referred to another well-known representative of this infamous class, who occupies one of the most palatial residences on Fifth Avenue:

I have a right to refer to that den of shame in our most crowded street, where every brick in that splendid mansion might represent a little skull, and the blood that infamous woman has shed might have served to mix the mortar with which that palace of iniquity was built. When I see American mothers with servants in livery, and all the evidence of splendor and wealth, frequenting those bloody courts and contributing to keep up this woman in her extravagance and licentiousness, I, in common with my fellow-citizens, should become indignant at this blot on the otherwise fair name of our city. It is not so much that the crime exists, but that it is not the only crime in the catalogue which defies the courts and juries. If there is any thing that adds to the atrocity of this crime, it is that the men and women who commit it take professional titles. What right has this infamous woman, by whose den of shame and blood we have to ride to get to the fairest scenes in our city—erected there as the old dragon's castle was, close by the gates of the fabled Eden—to take the title of "madame" upon her lips! "Madame RESTELL," forsooth! Madame Murderer, Madame Abortionist! And "Doctor" EVANS and "Doctor" WOLF—are they entitled to the name of doctor? Are they regular physicians? The defendant nods his head—then so much the deeper, and darker, and more damning his iniquity.

We are pleased to add that the defendant in this trial was found guilty, and was promptly sentenced by Judge Bedford to seven years' imprisonment in the State-prison at Sing Sing.

The examination in physiology for Bachelor of Medicine in the University of London, for the year 1872 and subsequent years, is to be a real and satisfactory one, at least, so far as histology is concerned. Each student is to have put before him mounted specimens, portions of fresh tissue, prepared for minute examination, all numbered, along with the necessary appliances, as microscopes, glasses, reagents, needles, etc., and is to be given three hours to examine and report upon them. He is also to mount certain specimens of particular organs or tissues.

Ammonia in Snake-Bites.—The *British Medical Journal* states that two additional cases, showing the efficiency of Prof. Halford's treatment of poisoning by the bites of venomous snakes, by injection of ammonia into the veins, have been published in the Melbourne papers.

Revaccination.—Mr. Simon, the medical officer of the Privy Council, has recently published an important memorandum on this subject. He believes that, by a successful vaccination in infancy, most persons are insured for a lifetime against an attack of small-pox; and that, in the proportional few cases where the protection is less complete, it will, on account of the vaccination, be generally so mild as not to threaten death or disfigurement. There is, unfortunately, a vast amount of imperfect vaccination, and consequently every population contains very many persons who, though nominally vaccinated, are liable to the disease. It is, therefore, advisable that all persons who have been vaccinated in infancy, should, as they approach adult life, be revaccinated. The best time for this is when growth is about completing itself, that is, from fifteen to eighteen years of age. If, however, there is prevalence of small-pox in the neighborhood, or if individuals are exceptionally exposed to infection, the age of fifteen should not be waited for, especially in the case of young persons in whom the marks of previous vaccination are unsatisfactory. Revaccination, once properly and successfully performed, does not appear ever to require repetition. In proof of this assertion, he states that the nurses and other servants of the Small-pox Hospital, when

they enter the service, are invariably revaccinated; and so perfect is the protection that, though the nurses are in close and constant attendance on the patients, and the other servants are in various ways exposed to the contagion, during thirty-four years there has never been known an instance where any one of them has ever contracted this disease. The Royal College of Physicians of London has sanctioned this report.

It is stated that Baron Liebig has entirely recovered his health and resumed his lectures in the University of Munich. His disease was successive attacks of boils.

Ten tons of the hydrate of chloral were imported, it is said, into England from Germany during the past year. The price, at first, was five pounds a pound; it is now selling at less than five shillings a pound. There being no duty on alcohol in Germony, the materials required for the manufacture of chloral being only alcohol and chlorine, there can be no competition with the manufacturers there.

The recent meeting of the Medical Society of the State of New York was unusually interesting and attractive. We regret that the limits and scope of the Journal will not allow us to give a full report of the proceedings. Dr. William C. Wey, of Elmira, was chosen President for the ensuing year. The presidency belonged this year to the district which includes this city and Brooklyn, but some factious opposition having been made to the candidate from New York, the committee evaded the whole difficulty by selecting the incumbent from the other extreme of the State. Dr. A. F. Doolittle, of Herkimer, is the Vice-President. Dr. Bailey, of Albany, retains the place of Secretary, which he has held so long and so successfully. Dr. Lansing, who for many years has been the Treasurer, is succeeded by Dr. Charles H. Porter, of Albany.

There were two unpleasant occurrences at the meeting. The first was the outcropping of the quarrel which has for more than a year divided the profession of Albany almost into two distinct parties. This, however, was promptly and

very properly repressed by the President, as such matters have no business or place in any but the local societies. The other matter to which we allude was the exposure of the remarkable plagiarism by Dr. Thoms, of this city, in an article published under his name in the *Transactions* of 1868. This article, it appears, is almost literally copied from the work on Hygiene, by Dr. Parkes, of London. This sort of thing reflects not alone upon the author, but in a measure involves the reputation of the Society, and the good name of the whole profession, and for our part we rejoice that Dr. Squibb had the courage to expose the whole transaction. Dr. Thoms's excuse denying any intention of wrong, was accepted by the Society, more out of charity to him, than from any sense of the justice or propriety of the explanation. We can only trust that such "irregularities"—if our readers will pardon the euphemism—whenever met with, will find an equally merciless exposure and reprobation.

The unanimous passage by the Society of resolutions thanking Dr. Sayre for his fearless efforts in meeting the malicious prosecution brought against him, in his alleged malpractice case, and thus securing a judicial decision of great value to the profession, is not merely a flattering compliment to that gentleman, but the expression of an opinion on the part of the profession that we trust will be heeded by any who may hereafter be inclined to incite other like "unpleasantnesses."

In the *Indian Medical Gazette*, Calcutta, January 2, 1871, there is published a case of elephantiasis of the scrotum of twenty-five years' growth, and which very closely resembles the celebrated case operated on in this city, by Dr. Thebaud, and reported in this Journal, for May, 1867. The tumor, however, was by no means as large as in Dr. Thebaud's case, the weight being only fifteen pounds.

The twenty-second annual session of the American Medical Association will be held in San Francisco, Cal., May 2, 1871, at 11 A. M. Secretaries of all medical organizations are requested to forward lists of their delegates as soon as elected, to the permanent secretary. Any respectable physician who may desire to attend, but cannot do so as a delegate, may be

made a *member by invitation*, upon the recommendation of the Committee of Arrangements.

W. B. Atkinson, M. D.,
Permanent Secretary.

At the fifth annual meeting of the Alumni Association of the Medical Department of the University of the City of New York, held February 27, 1871, Dr. Thomas C. Finnell presented the following resolutions, which were unanimously adopted:

Whereas, The Alumni of the Medical Department of the University recall with pride the labors of the founders of their *alma mater*, who changed the position of New York, in the medical profession, by making it a centre of medical instruction, and gathered to it students from all parts of our Union and the world; and—

Whereas, They also remember the advance movements made by the same Faculty, in clinical instruction, and increase of the term of study, by inaugurating spring, summer, and autumn courses: therefore—

Resolved, That we respectfully submit to the Faculty the questions of the expediency of still further advancing the cause of medical education, by an increase in the length of the regular winter session, and the division of the students into junior and senior classes.

Resolved, That we will heartily sustain our *alma mater* in any movement of this kind.

Resolved, That a copy of these resolutions be transmitted to the Faculty.

Small-pox in London.—The number of deaths in London, for the week ending February 4th, was 1,683; of these 196 were from small-pox. In the first four weeks of the year the deaths from this disease were, respectively, 79, 135, 188, and 157. No less than 118 of the fatal cases in the first week of February were of unvaccinated persons.

Dr. Liebreich, the eminent ophthalmologist, has, after examination, been admitted a member of the Royal College of Surgeons, of London. It is said that he will be appointed shortly to lecture on the diseases of the eye, at St. Thomas's Hospital, London.

Street-Salting to prevent the Development of Organic Poisons.—A solution of chloride of calcium and common salt, to which a little "chloralum" is added to increase its efficiency, is

recommended and used in London, for street-watering; and economy as well as health is consulted, for a solution of the deliquescent salts does not dry up like common water, and water and labor are spared, and disinfection is secured.

We regret to see announced the retirement of Mr. William Proctor, Jr., of Philadelphia, from the editorship of the *American Journal of Pharmacy*, which he has so successfully conducted for many years. Few men have done as much for pharmaceutical science as Prof. Proctor. His services and abilities are, we are happy to see, as fully appreciated abroad as at home.

Appointment.—Frederick D. Lente, M. D., of this city, has been appointed Professor of the Diseases of Women and Children in the Medical Department of the University of New York. This divides the chair hitherto occupied by Prof. Charles A. Budd.

The Medical Department of Trinity College, Toronto, Canada, it is reported, is to be revived during the coming summer, and lectures will commence in the fall.

New York Academy of Medicine.—Of the thirteen Fellows who have been elected to preside over this Society, nine have been removed by death, viz.: Stearns, Francis, Mott, Stevens, Cock, Jos. M. Smith, Batchelder, and Watson. The average age of these departed Presidents, at the time of their decease, was seventy-five years; excluding Watson, who died prematurely of malignant disease in his fifty-ninth year, the average age was seventy-eight years.—*Dr. G. M. Smith's Discourse.*

The French Institute has appointed a committee to inquire into the effects of the shelling of Paris upon the inhabitants as well as upon the buildings.

Baron Larrey has published in the *Revue des Cours Scientifiques*, an elaborate essay on the peculiarities offered by the wounds during the siege of Paris.

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Original Communications.

Art. I.—*The Objects and Aims of Medical Science, and the Relations existing between the Medical Profession and the Public.*[1] The Anniversary Oration before the Alumni Association of the Medical Department of the University of the City of New York. By Frederick D. Lente, A. M., M. D., Professor of Diseases of Women and Children in the University of New York, etc.

Fellow-Alumni of the Medical Department of the University of the City of New York: Selected, through your partiality, to represent you at this, the fifth anniversary of our Association, I am here this evening to extend to you the hand of fraternal greeting; abandoning for the moment the engrossing cares, the severe labors of our calling, and once again assembled about the hearth-stone of *Alma Mater*, to indulge, with you, in a brief respite of friendly intercourse, and to revive the pleasant reminiscences of our medical childhood; also to greet you, ladies and gentlemen, and to thank you for the interest manifested in our behalf. It is well for both of us,

[1] This article contains the "Oration" unabridged. A considerable portion was omitted by the author at the meeting of the Association.

the profession and the laity, our patients, to meet together on occasions like the present, and to become better acquainted as a body, since our respective interests are so intimately blended. And, since this acquaintance is, as yet, by no means so close as its mutual advantages require that it should be, we cannot, perhaps, more profitably employ a part of the time allotted us this evening than by endeavoring to remove certain misconceptions, which generally obtain among the public, regarding the objects and aims of scientific medicine, and its claims on public estimation and confidence; to consider the duties and obligations of scientific physicians, and the manner in which we have fulfilled and are endeavoring to fulfil these duties, and to cancel these obligations; and thus, as we hope, to vindicate our claim to a greater respect and confidence, even of gratitude from you, ladies and gentlemen, and those whom you represent. This will necessarily include a glance at the past, and a brief sketch of the present state of medical science.

At the outset, it is important that the public should know who constitute the medical profession. In most *foreign* countries, it is possible even for the public to separate the physician from the charlatan, the educated man of science from the ignorant pretender, inasmuch as the law lends its powerful aid to draw the line of demarcation, to protect both the physician and the public from the danger of imposition and deception. Deprived of this aid here, the public must take their chance; for, in this land of freedom and equality, the most ignorant boor has practically the same right to hang out, in the most frequented thoroughfares, the badge of our profession, as the man who has spent his patrimony, and the best years of his life, in acquiring a certain degree of mastery over its intricate problems, and a practical training to enable him to cope, with some hope of success, with its startling emergencies. In this great State of New York, the Empire State, and in this enlightened age, as we are in the habit of terming it, this is the disgraceful fact. We therefore find, on many occasions, the most arrant quacks, with bold and insinuating address, and frequently fortified by the certificates and recommendations of their clerical friends, received into the wealthiest and most intelligent

families, recognized as doctor or surgeon, and carrying off far larger rewards than an honest physician would have demanded. We find hydropaths, electropaths, rubbers, and bone-setters, quack oculists and aurists, with their rooms often crowded with the *élite* of society, and all hailed as "doctors," because the law allows them to assume that formerly honorable title. We read, in the prominent papers, how the verdant Mr. S——, from the country, visited the celebrated Doctor ——, and how he was tricked out of a splendid fee; or how, through the revelations of a coroner's investigation, Dr. E—— was arrested on a charge of committing the most infamous crimes under the cloak of the assumed title of M. D. You have not forgotten, and will not soon forget, it is hoped, the recent disgraceful tragedy in Chatham Street, nor the fact that the signs of no less criminal characters, well known to the agents of the law, are now conspicuous in many localities "down-town," and their advertisements staining the pages of the papers which you and your wives and daughters are reading every day. We find the columns of our principal papers occupied, not unfrequently, with an elaborate though most absurd explanation of a prevailing epidemic, by some charlatan seeking to attain a lucrative notoriety, styling himself "doctor," and received and quoted as such in opposition to the matured opinions of scientific men. The odium of the mistakes, the crimes, the absurdities, and failures of this class is, to a certain extent, visited on the heads of the regular profession, and lowers its standing in the public estimation. It is somewhat singular that the Western or younger States have taken the initiative in the enactment of stringent laws for the suppression, as far as possible, of those frauds and crimes; while our own State has actually been engaged in repealing, from time to time, the few restrictive laws which had, by great effort, been wrung from former Legislatures.

As we look back along the vista of medical history, even for two thousand years and upward, even to the days of Hippocrates, the father of medicine, or farther back, to the date of the Trojan War, when the sons of Æsculapius, the god of Medicine, flourished, when the immortal Homer, handing down his testimony, writes—

Patroclus cut the forky steel away,
When, in his hand, a bitter root he bruised.
The wound he washed, the styptic juice infused,
The closing flesh, that instant ceased to glow,
The wound to torture, and the blood to flow.

—and observe, among the successive epochs and generations, the great names, and great deeds of our illustrious predecessors, names not stamped on historic page with the impress of blood, deeds not memorable for hecatombs of human sacrifice, all starting forward to demand recognition from a grateful posterity, we shrink from the responsibility of individual mention. As regards the early fathers of our science, it will suffice merely to allude to the estimation in which they were held by their rulers and fellow-citizens, to prove the eminent services which they rendered. The ancients deified their celebrated medical men, and dedicated temples to their honor. The Athenians indicate the high estimation in which *they* held medical science, by one of their laws, which prohibited any slave or woman from prosecuting its study. Some nations stamped their effigies on the coins. The Greek physicians, coming to Rome, were complimented with the freedom of the "Eternal City," a privilege of which that proud people were extremely jealous. Their great orator, Cicero, says, that "Nothing brings men nearer the gods than by giving health to their fellow-creatures." "When the elder Cato," says the historian Renouard, "pursued, with his ordinary obstinacy, the philosophers, rhetoricians, and physicians of Greece, whom he accused of corrupting the manners of the Romans, and finally succeeded in obtaining a decree for their expulsion, notwithstanding all his efforts, the physicians were excepted in the decree." "Socrates, in his last discourse with his friends, requested them to offer a cock, as a sacrifice for him, to Æsculapius." To come down to a later period, I would point to Vesalius, the first dissector of the human body, as he is depicted by the great painter—in his lonely apartment, the cadaver on the table, the knife in his hand, his eye on the crucifix, the anathemas of that terrible engine of cruelty, the Spanish Inquisition, vainly thundering in his ears. "The sublime spectacle of Vesalius, in his first dissection," says Dr. Gray, in his

address before our State Medical Society, "illustrates the holy ardor, the nobility, the heroic courage of the profession, in his age, and in all ages. In the path of investigation were toil, and dishonor, and death, but it was the road of life for all the race of men. On his vision shone the glorious light of coming triumph in medicine—the disenthralment of that science which should save the race. He died a martyr to his zeal, but his work survived." How different the conduct of Galileo, the philosopher, publicly denying, under similar circumstances, the truth of his grand discovery! Witness Pinel, after years of persistent toil, and persuasion, and countless refusals, finally allowed to go on his great mission of philanthropy, to the Bicêtre in Paris, that menagerie of human wild beasts, more savage, from the effects of harsh and misdirected treatment, than the beasts of the forest, the fettered victims of public ignorance. See him enter alone and unprotected, his countenance beaming with love and sympathy, fear forgotten in his divine errand; see him strike off the shackles, and lift up the poor, maimed, and forsaken wretches; see the fires of madness and revenge die away in their eyes, as they gaze into his. Here is a scene for the painter, a theme for the poet, a lesson for the Christian. Consider the incalculable benefits to our race, which have arisen from the simple discovery of Jenner, who, for over thirty years, sacrificing comfort and practice, braving ridicule and detraction, threatened with expulsion from the clubs, yet never swerving from his determination to work out the problem, which was to furnish the greatest earthly boon ever vouchsafed to man. "The persecutors of Galileo," says Dr. Baron, "would, I believe, have been eclipsed in their monstrous and outrageous hostility to the splendid discoveries of that illustrious man, by some of the opponents of vaccination, had the spirit of the age, or their own power, enabled them to carry their designs into execution." Now that small-pox has thus, for so many years, been shorn of its terrors, we are apt to forget that scarce half a century has elapsed since this disease constituted the most dreadful scourge of our race. In the Russian Empire it is said to have swept off nearly two millions in a single year. Dr. Lettsene calculated that two hundred and ten thousand fell victims to it annually in Europe.

Of those that recovered, many were blind or partially so, many so disfigured as hardly to be recognizable, many left, with fatal disease developed by its ravages in the system, to linger out a painful existence. At this day we have examples to show that its virulence and ravages are just the same as they formerly were, whenever it attacks a community unprotected by vaccination. This very day I read in the *Herald* that "the small-pox is committing fearful ravages in the Red River country. Two thousand Indians and half-breeds have died recently in the Saskatchewan district." If, from the medical profession, no other benefit to the race had proceeded but this, it would have been entitled to the gratitude of mankind for all time to çome.

In fine, the history of medicine and of medical men is, from the earliest ages, the story of struggles for the melioration of the human race, often in the face of the prejudices and discouragements, even the persecution of that race. Every great stride in advance of the civilization and the ideas of the age has been regarded with suspicion, often thrust back again and again, but never arrested. Every bold assertion of a new and startling truth, worked out by years of toil, and danger, and death, has been looked upon as a heresy, only to be recognized after the general intellect had marched up, year by year, as in the case of vaccination, to its advanced stand-point.

In looking back, with an appreciative eye, on the labors and the triumphs of our predecessors, we do not *rest* on their achievements, but we make these a point of departure for ours. We receive the rich heritage, but we do not sit down to enjoy it in self-complacent ease: we glory in the prospective as well as the retrospective. Our motto is "Onward, upward." History, official statistics, French and English especially, our periodical literature, establish the fact of a solid and rapid advance in the science and art of medicine—such an advance as lengthens the average span of human life, as mitigates human suffering, and promotes human comfort, and enhances generally the pleasure of human existence. He who charges medical science with being a laggard in the march of intellect, of scientific progress, of practical improvement, affords indubitable evidence that he himself has failed to appreciate what

has been transpiring around him in the scientific world, and is ignorant of its current history. Let us, in illustration of this assertion, pass, in rapid review, some of the more prominent of these improvements and inventions. First, the practical and now almost universal application of the *microscope* to the diagnosis of disease, and especially to the detection of those causes of epidemics and epizootics which had formerly necessarily eluded our keenest investigators, the discovery of which has been of such vast importance to our race, in preventing or limiting the spread of fatal diseases both among men and animals, and which we may notice more particularly under the head of *hygiene*.

"The great advances of science," says Dr. Maudsley, "have uniformly corresponded with the invention (or utilization) of some instrument, by which the power of the senses has been increased, or their range of action extended."

Let us dwell, for a moment, on a still nobler use of the microscope. In the hands of Dr. Beale, a distinguished English physician, it has done what all the philosophers, and all the theologians, and all scientific talent combined, had previously failed to accomplish. It has demolished the materialistic and atheistic doctrine of "spontaneous generation;" just as the discovery of an apparently insignificant fossil, the "*Asterolepis of Stromness*," in a little far-off seaport of the Orkneys, by the lamented Hugh Miller, gave the death-blow to the no less atheistic "*development theory*," so interestingly set forth in the "Vestiges of Creation," a book which most of you have probably already nearly forgotten. It is impossible to give you any very definite idea of how Dr. Beale upset the spontaneous-generation theory with his microscope, and his book showing "how to work" it, without going into a history of the development of this theory and its supposed facts, from the great Schwann, with whom it may be said to have originated, through Robin, and the French school, to Darwin and Darwinism. Suffice it to say, that Darwin erected his atheistic temple on what he terms the "primordial form." But Beale proves, by his microscope, and its skilful use, that there *is* no such form, and that therefore this temple is founded on sand or something even less substantial. He proves that

there can be no development from a primordial form or vegetable cell into an animal, because the microscope shows that all vegetable cells have double walls, while animal cells have single walls; while it gives this further confirmation—that, if you give *organic* nourishment to a double-walled or a *vegetable* cell, it dies, whereas *inorganic* food causes it to spring up and grow. The reverse happens with the single-walled, or *animal* cell. All this is a matter of sight, not of speculation; what not only Dr. Beale, but any other microscopist may see. Thus we perceive how wonderfully, how mysteriously God manifests His truths unto us; how intimately blended are the interests of science and religion, and how absurd the efforts of those who, from a want of appreciation of scientific investigations and truths, have sought to array them in antagonism.

"Who would suppose," says Dr. Acland, in his inaugural address before the British Medical Association," that the question of spontaneous generation, so keenly debated from a very early period, to our own year and day, need have any bearing on practice? Yet see how the observations of Pasteur are connected with the questions of infection, nay, more, of suppuration, and (as shown to be probable by Prof. Lister) of surgical treatment. It would, indeed, be a great point if we could prove that no germs, carriers of disease, spontaneously originate, but must always come from a progenitor-cell. If so, there would be just a hope that some diseases might be effectually stamped out." It is not too much to expect, I think, that the microscope will, ere long, prove this. The *dynamograph*, or power-measurer, reveals to us what we had formerly very roughly to estimate—muscular power, nervous energy. *Photography*, in connection with the *stereoscope*, has been called into requisition to represent the exact appearance, either of healthy or diseased specimens, and we are thus rendered independent of the skill of an artist. The *endoscope* enables us to look, by reflected light, into the cavities of the body, and removes some obscure pathological conditions from the field of conjecture to that of certainty. By the aid of the *laryngoscope*, we look into the *larynx*, into the *trachea*, or windpipe, and even down the *bronchi*, almost into the lungs, and actually see the diseases instead of inferring them from the symptoms. Not

only this, but, guided by the light of its reflector, we pass the knife, through the mouth, deeply into the *larynx*, and remove morbid growths, thus obviating the disagreeable and dangerous procedure of external incision, nothing being cut but the disease itself. We may also take a specimen from the disease, with little or no inconvenience to the patient, place it under the microscope, and decide, in some cases, between cancer and non-malignant disease, and thus upon the chance for cure.

By that remarkable instrument, the *sphygmograph*, which is so attached to the forearm that the pulse-beats, striking a spring, are transmitted to an index, holding a pen, the heart is made to register its own action on a sheet of paper, the character of its chirography indicating health or disease, and their different grades; and thus also, to a certain extent, indicating the condition of the nervous system, under whose influence it pulsates. By the use of the reflected light of the *perforated mirror*, the diagnosis and treatment of the diseases of the *ear* have been greatly improved in accuracy, while the *ophthalmoscope* has revolutionized the diagnosis of diseases of the eye, by enabling the oculist to see the condition of its posterior tunics, its *media*, lens, etc., as plainly as we see the *cornea* or the lids; not only this, but, through the eye, as a window, to look at the condition of the cerebral vessels and circulation, to say whether there is *hyperœmia* or *anœmia*, too much or too little blood, and thus to diagnose constitutional as well as local affections. Its revelations have even been applied to business transactions. In a recent case, in England, Mr. Hart, now resident with us, prevented an insurance company from advancing a heavy sum on the life of a gentleman already insured, but in whose case an ophthalmoscopic examination was necessary, owing to some anomaly of vision. The examination led to the conclusion that the arteries of the brain were atheromatous, or diseased, which subsequent events confirmed; just as the microscope, in the hands of a physician of Poughkeepsie, a year or so ago, led to the detection of an ingenious forgery which all other means were powerless to prove.

The *thermometer*, a very old instrument, and, more than a hundred years ago, applied to the elucidation of physiological and pathological problems, has lately been utilized,

and now forms one of the most important of our modern aids to *diagnosis.* In many doubtful cases, it now substitutes certainty for conjecture, and enables us to predict phenomena long before they are apparent to the unaided senses, and, in many instances, to ward off most fatal complications. An example, taken from a book published many years ago, by Dr. John Davy,[1] will illustrate its usefulness in medicine. "On the 4th of August, the temperature under the tongue (of a lunatic) was found to be 104.5° (the normal temperature is, as you know, 98°) and his pulse rapid. This called attention to his state; and, although he made no complaint—his appetite good—the functions, as far as known, tolerably well performed—it was inferred he had obscure disease of the lungs. He died in less than month. The fatal disease was pulmonary consumption, organically considered, in an aggravated form, but, in relation to symptoms, most mild. There were ulcers of larynx without affection of voice; most extensive disease of lungs, vomicæ and tubercles, without cough; ulceration of intestines without diarrhœa, and other disease equally latent, and without pain." *The electric bullet-probe* may be mentioned as one of the ingenious and useful inventions of the day. It is connected, at one end, with an electric chime, and, when the other end comes in contact with metal, as a bullet, the chime announces the fact. At the first trial with it in Berlin, "Staff-Surgeon Kemperdick succeeded in finding a ball lodged in the bones of the foot, which had been vainly sought for during six weeks." This is even more ingenious than the instrument contrived by the celebrated French surgeon, Nélaton, and with which, as you may remember, he discovered in Garibaldi's foot the ball which had eluded the search of the Italian surgeons and of an English surgeon who travelled all the way from England to see him, and with which I myself, with two army surgeons at West Point, succeeded in finding a ball lodged in the thigh-bone of an officer, which had lain there for over a year, and which was fast hurrying his case toward a fatal termination, the verification of the metal leading to treatment which eventually restored a meritorious officer to

[1] "Researches, Anatomical and Physiological." London edition, vol. i., p. 206.

perfect health. I think we may fairly rest our case here, as far as mechanical contrivances, in aid of diagnosis, are concerned, though the list is not exhausted. Most of these are of such recent introduction as scarcely yet to have come into general use, even in large cities and hospitals. But I should not fail to *allude* at least to the great advance made, in this country especially, in the mechanical improvements of surgery; particularly in the management of fractures, and in the correction and cure of deformities of the spine and limbs, *directly*, by supports, and, *indirectly*, by the new method of assisting weak muscles to develop, and thus to effect a physiological cure. So simple a matter as the use of adhesive plaster and of "plaster of Paris" in surgery has effected almost a revolution in some of its departments; while, by their use, the comfort of the patient, during treatment, has been greatly enhanced. What wonders have been effected in surgery, and especially in that of women, by the simple fact of the introduction of the *metallic suture*, by our distinguished countryman Sims, whose fame is world-wide, who taught the great surgeons of the European capitals a lesson, which, with all their science and skill, they had not been able to learn before! But time will not permit us to dwell longer on the fruitful topic of surgery. Those of you who had the good fortune to hear the recent lecture of my friend Prof. Hamilton, before the American Institute, can form some idea of what science has been doing in that great department. Our means for *resuscitating drowned and otherwise asphyxiated persons* have been greatly improved and simplified; and the miracle of restoring the dead to life is now a common occurrence. The efforts of certain physicians, toward the *improvement of the condition of idiots* and idiot asylums, have been attended, during the past few years, by most signal success, and these unfortunates are now, as a very general rule, elevated from the level of the grovelling brute to that of a more or less useful citizen. If the *inebriate asylums*, which this country has the honor of inaugurating, have been less successful, they still give promise of future results, and a more necessary and praiseworthy effort for the benefit of individual happiness, the safety of society, and the welfare of the State, could not enlist our sympathy and earnest support. Medical

progress in *the management of the insane* has not been behind that of any other department. Personal restraint has, I believe, been universally abolished in regular asylums, and this fact stands, of itself, an index of the progress which has been made. But, if the profession have done *their* duty in this matter, the public have not. The condition of a large number, especially of the chronic insane, scattered among the poor-houses, in almost all of our counties, is deplorable, and a disgrace to the civilization of the age, which should be abated without delay; and we, as medical men, should not relax our efforts until we compel our legislators, by placing constantly before their eyes such facts as most successfully appeal to the coldest sympathy, to afford an asylum to all these unfortunates. The report of the Hudson River State Asylum for the Insane, from the pen of my able friend Dr. Cleaveland, sets forth, with startling detail, " the shocking state of the insane in our poor-houses, and exhibits the shameful and persistent neglect with which the earnest appeals from disinterested philanthropists, from physicians, from State governors, conventions of county ' Superintendents of the Poor,' and even from their own committees, have been treated by successive Legislatures, from the time when Miss Dix, twenty-seven years ago, made her eloquent and indignant, though unavailing appeal." Great advances are being made in the study of *climatology* of late, which bid fair to make that branch of medical science of some value. The term " medical geography " has been recently applied to the study of the distribution of diseases over the surface of the earth, and an atlas is supplied, showing geographical zones, and thus marking, with precision, the localities and boundaries of the principal endemic diseases of the earth. This is of more importance, in a country of such vast extent as ours, than in any other.

A prominent characteristic of all our improvements, both in medicine and surgery, has been the power thereby afforded us not only of saving life and limb, but of doing so by more expeditious, more safe, and more comfortable methods; *tuto, cito, et jucunde.* In no particular does our modern treatment contrast more strongly with that of our old masters, than in this particular; and to the introduction of the *hypoder-*

mic syringe, by Alexander Wood, of Edinburgh, do we owe a large part of our ability to cope, with complete and prompt success, with pain, the most important element of disease. To allay pain is often the first step toward the cure of disease, and sometimes even more important than to save life. How many, when suffering from the pangs of cancer, of neuralgia, and similar diseases, have wished for death a hundred times! How many poor wounded soldiers, on the battle-field, have prayed for a friendly bullet to end their sufferings! There should be a fund raised to build a monument to Wood, and every one who has felt the relief of his instrument should subscribe to it. Lastly, it is scarcely necessary, before an audience like this, to mention the crowning glory of medical advance in the last half-century—*anæsthesia*. Who is not familiar with its brilliant history? Who is there that has not experienced its benefit, or witnessed its heavenly influence over some suffering friend? How wide-spread, how complete its success! And to America belongs the sole glory of its utilization, if not of its discovery, notwithstanding the persistent efforts in Great Britain to wrest it from us.

With all our improvements and advances, however, we are painfully conscious that the *relations existing between the medical profession and society*, *especially the educated classes*, are far from satisfactory or complimentary to us. Why is this so? There are many reasons, some external to, and some, unfortunately, within the profession itself. To a *misconception of our aims and duties*, *and*, *as a corollary*, *to a want of appreciation of what we have done*, *and are doing for the benefit of society*, may be ascribed a large share of the comparatively low estimate at which we are held. To remove this misconception, then, and to impart the necessary information, is a matter of prime importance. It is marvellous how little the public know of us or of our science, how little, in fact, non-medical men know of themselves; and yet they imagine they know a good deal, and, what is worse, they act on that presumption. Listen to what the celebrated Prof. Huxley says in a recent lecture before the *élite* of London: "I am addressing, I imagine, an audience of educated persons, and yet I dare

venture to assert that, with the exception of those of my hearers who may chance to have received a medical education, there is not one who could tell me what is the meaning and use of an act which he performs a score of times every minute, and whose suspension would involve his immediate death—I mean the act of breathing—or who could state, in precise terms, why it is that a confined atmosphere is injurious to health. The practical value of physiological knowledge! Why is it that educated men can be found to maintain that a slaughter-house, in the midst of a great city, is rather a good thing than otherwise?—that mothers persist in exposing the largest possible amount of surface of their children to the cold, by the absurd style of dress they adopt, and then marvel at the peculiar dispensation of Providence, which removes their infants by bronchitis and gastric fever? Why is it that quackery rides rampant over the land; and that, not long ago, one of the largest public rooms in this great city could be filled by an audience gravely listening to the reverend expositor of the doctrine—that the simple, physiological phenomena known as spirit-rapping, table-turning, phreno-magnetism, and by I know not what other absurd and inappropriate names, are due to the direct and personal agency of Satan? Why is all this, except from the utter ignorance as to the simplest laws of their own animal life, which prevails even among the most highly-educated persons in this country?"[1] And yet Huxley's countrymen are ahead of us in the endeavor to diffuse proper medical knowledge. On the tables of most of the clubs in London may be seen the London *Lancet* and *Medical Gazette*, by the side of the London *Times*, *Chronicle*, etc. Let me therefore hope that you will bear, with patience, the infliction while I attempt to profit by this occasion, which we physicians seldom enjoy, of meeting you collectively, face to face, and strive to effect a better understanding between us. To you as individuals, and collectively, as constituting society, and the *personnel* of State, and of Government, our relations are so numerous and so intimate, that to do any reasonable degree of justice to their consideration must necessarily compel me to draw somewhat largely on your time and patience.

[1] "Lay Sermons and Addresses," etc., p. 89.

A too common mistake is to suppose that the ability of the surgeon is measured by his dexterity in operating, and that of the physician by his knowledge of drugs, and his skill in administering them. This is a very narrow-minded and prejudicial view of the science and art of medicine. Though skill and celerity in operating are desiderata always to be acquired if possible, they by no means guarantee the best surgeon. Accuracy in diagnosis, judgment as to the propriety of operation, and the proper time for it; the preparation of the patient, and the management of the case afterward, of the complications always liable to occur, the proper support of the strength, and a hundred *minutiæ*, will engage the care and attention of the skilful surgeon, and generally form a vastly more difficult part of his duty than the mere mechanical procedure, though this may involve the necessity for a large share of anatomical knowledge. If a surgeon save a limb which others have considered hopelessly injured, we accord him praise far higher than we ever do for the most dexterous amputation. Throughout our late calamitous war, the greatest trimphs of surgery consisted in the saving of limbs which, under similar circumstances, had been previously condemned by the eminent authorities to amputation. Exsections, or the cutting out of the fragments of injured bone, were practised largely instead of amputation, and often no operation at all, but only careful management, aided by a judicious mechanical contrivance. So that the greatest boast of our surgeons was, not the number of amputations performed, but the number avoided—the number of desperate cases which they had conducted unmutilated to a favorable termination, often under the most untoward circumstances, and with very inadequate means. The records of the Surgeon-General's Department at Washington attest this. Nor is the physician's sole duty, nor the principal part of it, the search for efficient drugs, and the pouring them into the patient's stomach. If he have a proper appreciation of his office, he will be more ready to give advice than medicine, to leave the latter for those who have neither the wisdom nor the moral courage to profit by the former. The search for and the removal of surrounding conditions tending to foster the disease, especially if of a

chronic character, the regulation of the habits of the patient, his business, his diet, his sleep, his exercise, the ventilation and temperature of his apartments, his mental condition, and many other matters pertaining to his every-day life, must be duly considered; and, if he cannot, or will not, as is the case with too many, heed the advice which might supersede the call for drugs, then we must choose between two evils, disease and medicine; for the circumstances in which our patient may be placed, or his own choice, makes medicine a necessary evil; and it depends on the education, the care, and the judgment of the physician, whether it is a less or greater evil. The case is much the same with the lawyers. An honest lawyer will often advise his client against recourse to the law; to compromise, and thus to avoid the annoyances and expense of a doubtful suit. But, so long as society is as at present constituted, men obstinate and revengeful, litigation, like medicine, will continue to be a necessary evil. Pope says, "All partial evil is universal good." You have all heard of Mr. Abernethy, one of the most remarkable men of his day. His eccentricities and pithy sayings have become matters of general history. In truthfulness, bluntness, and independence, no one ever excelled him, no one either in genuine kindness and charity. Well, if you will indulge me for a few moments, I will recount one or two anecdotes connected with him, which perhaps some of you have heard, but which will serve to impress what I have just been saying on your minds. "Mrs. I—— consulted him concerning a nervous disorder, the minutiæ of which appeared to be so fantastical, that he interrupted their frivolous detail by holding out his hand for the fee. A one-pound note and a shilling (the customary sum) were placed in it, upon which he returned the latter to his fair patient, with the angry exclamation: 'There, ma'am! go and buy a skipping-rope, that is all you want.' 'Pray, Mr. Abernethy, what is the cure for gout?' was the question of an indolent and luxurious citizen. 'Live upon sixpence a day, and *earn* it,' was the reply.' The late Duke of York was reported once to have consulted Abernethy. During the time his Highness was in the room, Abernethy stood before him with his hands in his breeches-pockets, whistling with great coolness. The duke,

naturally astonished at his conduct, said, 'I suppose you know who I am? 'Suppose I do, what of that? If your Highness of York wishes to be well, let me tell you,' said the surgeon, 'you must do as the illustrious Duke of Wellington often did in his campaigns, *cut off the supplies*, and the enemy will quickly leave the citadel.'"

This topic naturally leads us to the discussion of *hygiene*, or the science of the *causes and prevention of disease*, as applied to the individual, and, in its wider and more important application, to the public and the State. Some of our greatest triumphs in modern times have been in this department. The most marked exemplification of this may be seen in the records of the Army and Navy, especially the latter, where, in consequence of the thorough manner in which the suggestions of the surgeon are enforced, through the isolation and perfect discipline of the crew, disease, in an epidemic form, is almost unknown; or, when it occurs, is "nipped in the bud." For instance, by the simple and certain process, in the case of yellow fever, of filling the vessel with steam from her boilers. Witness also the extraordinary healthfulness of our armies in the late war, operating in a climate to which they were entirely unaccustomed, and under circumstances most likely to induce disease. If we have not made any boastful progress in the pathology and treatment of that most terrible of modern plagues, *Asiatic cholera*, we have done what is of more importance towards the saving of life; we have discovered the conditions under which it is developed, its mode of propagation and spread, and we have thus been able, whenever our suggestions have been faithfully carried out, to limit its ravages. This achievement assumes proportions of no small magnitude, when we call to mind the many hundreds of thousands of victims annually sacrificed during its successive marches over a large extent of our globe, and the panic and prostration of business which it has caused in this city. Indeed, it is here, through the efforts of the physicians attached to the "Metropolitan Board of Health," that the greatest success has been achieved, at least two epidemics having been "stamped out," with an incalculable saving of life and trade. As recently as last summer, eighty-three cases of yellow fever occurred on

Governor's Island, right in our midst, and one hundred and two vessels arrived at quarantine with the disease on board, and yet no single instance, I believe, of the fever occurred in the metropolitan district, and that in a season most propitious apparently for its spread. Listen to what one of our prominent daily journals had to say about another epidemic, quite new to us—relapsing fever: "The result of the vigorous and decisive action of the Board of Health, and the coöperation of the Commissioners of Charities, have proved most gratifying. While the Sanitary Authorities of London have signally failed to control this epidemic, and it is now taxing that city to its utmost to provide for the sick, in New York the relapsing fever has shown no perceptible increase for several weeks. During this period upward of one hundred fever-nests have been broken up, the places thoroughly cleansed and disinfected, and many have been permanently closed. Meantime the search for hidden cases is rigorously prosecuted in lodging-houses, sailors' houses, and among the haunts of vagrants, and there is now every reason to conclude that, if this vigilance is continued, we may be spared the visitation which now oppresses London." And we *were* spared, although the disease manifested its contagious qualities as strongly as it did in London, spreading rapidly among the patients, nurses, and physicians at Bellevue Hospital, to which the first cases were carried. See what was done in the case of another epidemic. In May, 1869, notwithstanding the advice of physicians, promulgated in all parts of the city among the poor, to revaccinate, and the gratuitous distribution of lymph for the purpose, "the disease (small-pox) was found lurking in a hundred different localities in the city." Then the Board "undertook general vaccination by systematic house-to-house visitation. This was accomplished by eighty physicians. Nearly one hundred and seven thousand persons and thirty thousand houses were visited, making the needful inspection of almost half a million of the population, and actually vaccinating more than thirty thousand." "In consequence of this thorough work," the Board goes on to say, "the small-pox, which threatened to overspread the city, was at once arrested." Contrast this result with what occurred in

Paris at the very same time. In one week, in July, there were two hundred and sixty-seven deaths from small-pox, and more than seven thousand cases occurred between January and May, while in January, February, and March, there were eight hundred and ninety-six deaths from it. There is ample reason to believe that this was all due to the "*unsettlement of public confidence in vaccination*."[1] The picture presented by the city of Barcelona, in Spain, less than a year ago, when the yellow fever was, by a careless quarantine, allowed to effect an entrance there, shows that we are no more exempt now from the consequences of a disregard of sanitary science than in the Middle Ages; that the same wholesale destruction of life, the same panic and disregard of social relations, the same prostration of commercial prosperity, are its inevitable result. And I would ask of my non-professional friends here, and the public generally, are you aware how this great engine of municipal reform was created? Was it through the votes of those poor wretches whose lives have been made tolerable, if not pleasant, by its beneficent operation? Was the enactment of the law creating it effected by the combined efforts of those landlords whose property, as the reports of the Board have clearly demonstrated, has been largely appreciated by it? Did the intelligent, the educated, the patriotic of our citizens, seize upon the bill as soon as it was offered, and insist upon its passage as an act of necessity, of charity, of justice, as an act

[1] Just now small-pox is again spreading over the city, as over other portions of the civilized world, and why? Because the same efficient system of revaccination, as well as vaccination, is not practised. The homœopathic fraternity have a good deal to answer for in this matter, since they have generally advised strongly against vaccination, with no better reason than they can give for any other part of their creed. Instead of this simple means of preventing the spread of the disease, we see respectable people, with mild attacks of varioloid, dragged out of their comfortable homes and beds, in rain or snow, and carried—where? By land and water, to an overcrowded hospital on Blackwell's Island, in a condition not fit, at this time, for the reception of the meanest beggar. I can conceive of no greater outrage on private rights than this. Since this was written, more extensive accommodation has been provided by the Commissioners, and the condition of the hospital has been much improved. But small-pox patients of the better class should have accommodation on this Island, and, if necessary, be charged for it.

which had already been too long delayed to the detriment of all classes of our population? No! Strange as it may seem, it was left for that class whose *pecuniary* interests were to be directly injured by the provisions of the bill, to fight it through the Legislature inch by inch, and year by year, against the combined influence of all other classes; to employ their time and their money, too, to overcome the factious and short-sighted opponents of the bill. It is to be hoped that, at some future day, the public will be forced, by the repeated examples presented to them of the unselfish devotion of medical men to their interests, to the conviction that, when they ask for restrictive laws regulating the practice of medicine and pharmacy, these are merely to separate the man of science, working for the public good, from the dirty charlatan, pandering to the fears, the vices, the crimes of our youth of both sexes; laws which would not merely redound to the benefit of one class, as has heretofore been uncharitably contended by our legislators, but to the good of all classes, who have not otherwise the means of judging between the false glitter of tinsel and the brightness of the true gold.

The ultimate results of the most destructive wars have often been of the utmost service to the material progress of nations, and the actual advance of civilization. Thought, education, development, science, must assert a superiority over barbarism, wrapped in its mantle of complacent egotism, and maintain it, not by argument, which would be useless, but by brute force, which, as recent notable transatlantic examples have taught us, is as much a characteristic of our boasted civilization of to-day as it was a thousand years ago. Our own civil war, from the shock of which we are slowly but surely recovering, was but a necessary episode of our history, as it has been of all other nations before us, though we may be as yet slow to acknowledge the benefit which has resulted and *will* result, especially those of us who failed to gain the immediate reward from the shock of arms that was expected. To such it seems a sorry return for the disruption of family ties, contempt and hatred substituted for love and friendship, bereavements innumerable; widows and orphans, in their sable garb, spreading sadness over the land; poverty

and destitution invading the hearths of the educated, the refined, and the opulent; vice and immorality engendered; an inaptitude for steady, honest labor; a tendency to the highest crimes induced by long familiarity with carnage, destruction, suffering, and death. But every page of history tells us that the means to the end must always be accompanied by just such terrible evils. It is just here that medical science asserts and proves her superiority over all others. From the very *evils* of war, the disease, the mutilation, the loss of life, which would, otherwise, stand to a degree as an unmitigated offset to the benefits obtained, we, as physicians, deduce practical lessons of the highest value to our fellow-men. We thus impart, to the suffering and death of the patriots who flocked to their country's standard in her hour of need, a twofold value: rendering their sacrifice doubly honorable—a vindication of right and justice, and means for the melioration of the sufferings, and the salvation of the lives of future heroes, their children, or perhaps their children's children. It is difficult, nay, impossible, within my present limits, to give you an idea of the mass of valuable information accumulated by our military surgeons, North and South, during the war, and by the civil surgeons, who, "scenting the battle afar," abandoning home and comfort, a lucrative practice, and without pecuniary reward, rushed to the blood-stained fields to render their valuable aid. But, through the skill and energy of our late surgeon-general, a grand National Museum, medical and surgical, was inaugurated at Washington, and most ably fostered by his successor, and his accomplished assistants, which is the wonder and admiration of all the distinguished surgeons of this and other countries who have had the good fortune to see it. Dr. Valcourt, of Paris, in his report to the Minister of Public Instruction on the "Medical Institutions of the United States," characterizes this collection as, "beyond doubt, the most curious, the most instructive, and the most complete in the world." It contains thirteen thousand five hundred and two specimens, and its descriptive catalogue alone forms an enormous quarto volume replete with invaluable information. A fact which renders the collection more valuable than any in Europe, independent of its nearer approach to completeness, is, that the cases are

followed up and their histories studied after their discharge from the army. We thus become acquainted with the final results of operations or treatment—a point of the first importance in estimating their relative value; whereas, "in the reports of the surgery of European wars, and of campaigns in India, Abyssinia, and elsewhere, the history of the cases terminated when the men were invalided or discharged."[1] And the same remark applies to the French armies in the Crimean and Italian campaigns. In illustration of the widely-extended benefit of this magnificent collection, Surgeon-General Barnes in his last report says: "It is noticeable that, in the standard, systematic work on surgery by Billroth and Von Pitha; in the last edition of the English 'System of Surgery' by Holmes; in Didiot's 'Service de Santé des Armées,' and in nearly all works on military medicine and surgery printed in the last few years, the majority of the woodcuts are derived from specimens in the United States Army Medical Museum." It is to be hoped that Congress will not fail to see the advantage, nay the necessity, of spreading this information before the world, by responding to the wishes of the surgeon-general, and the profession, by the publication of a full medical and surgical history of the war, cost what it may. Thus, you see, even from this imperfect sketch of the progress of the science and art of medicine, that we have been no laggards in the race of improvement; that, while continents have been traversed by railroads, and oceans, separated by continents, thus brought together, deep and tumultous rivers spanned by bridges, adding to the sublimity and effectiveness of the scenery, by their majestic arches of solid masonry, or by their delicate curves thrown high in the air, by a triumph of modern engineering skill, festooning their precipitous banks, enhancing their beauty, as well as adding to the celerity and safety of transit; while we see the East-India voyage, proverbial, from the earliest history of maritime enterprise, for tediousness and danger, reduced, by the skill and indomitable energy of Lesseps, to the tameness and monotony of a canal; and a project which will not be long in fulfilment, to reduce the transit to nine days, by the enterprise of our railroad kings;

[1] Report of Surgeon-General Barnes.

while we see the bottom of the great deep traversed thousands of miles in all parts of the world by electric cables, enabling us to converse with England or India at will, and its surface furrowed by splendid steamers, landing on either side almost with the regularity of ferry-boats—compared even with these wonderful triumphs, medical science may proudly claim a position in the vanguard of the army of progress.

While justly claiming for ourselves, however, such a position, we are painfully conscious that there are causes, operating within the profession, which tend to retard our advance, and to lower us in the estimation of the educated classes. To some of these only will it be possible to allude on this occasion, and first we note *a want of interest in our local medical organizations*, formed for the purpose of mutual improvement, and fully capable of affording it, if properly supported. The success of these societies, county and municipal, seems to depend too much on the capacity and energy of their officers, while there is abundant reason that they should enlist as hearty support on the part of every member, both for the promotion of the direct interests of our science, and the no less important indirect influence induced by enhancing the moral and social *status* of the members, the production and maintenance of a certain *esprit du corps*, which is nearly impossible under other circumstances.

Another cause is a palpable *neglect of our periodical literature*, both in the failure to support the journals by our subscriptions and by our literary contributions. "Of one hundred and twenty medical journals that have made their appearance within the last fifty years," says a medical editor, "fully one-half were discontinued within from six months to three years from the commencement of their publication. Of the remaining number, twenty did not continue beyond five years; and, of more than thirty now being published in this country, only thirteen have been in existence more than a single decade." We hear frequent assertions that our journals, as a rule, are not worthy of support, are not creditable to the country, and the present state of our science. If this be so, why is it? Whose fault is it that they are not more worthy? Not that of the editors, though they are not beyond improve-

ment. They are, as a class, capable, industrious, and well-meaning. Unfortunately, they have small means to invest in a work which is to benefit the profession rather than themselves. They appeal to those having facilities which they have not, to aid them, and this aid is withheld. Without the interest and coöperation of a considerable number of competent contributors, no journal can succeed. With these, combined with a very reasonable amount of editorial talent and energy, any journal will succeed. I deny, however, that there is any medical journal in the country which is worth less than the price of the subscription and postage to any physician. If we glean but one item of important information, one practical hint, which we should have obtained nowhere else, from the seven or eight hundred pages afforded by the yearly volumes, our money and time are well spent. It is a matter for congratulation that there is a manifest improvement, of late years, in the character of our periodical literature, and the reputation of our journals.

There is one relation between physicians and their patients, of so much importance to both, that a reference to it should not be omitted on such an occasion as this—namely, that of *dollars and cents.* Every sensible person is aware of the fact that an article purchased at a low price is not always cheap; and it is eminently so in the case of the services of medical men. If the physician is poorly paid, and has a struggle for the bare means of living, he has but little money for the purchase of books, and as little time for reading them; in fact, not even time for *reflecting* on cases involving obscurity and doubt, which is of as much importance as reading. Besides, his mind and body are worn out with overwork, and irregularity of eating and sleeping, and his judgment, at times, thus impaired. This must react unfavorably on his patients, who are thus deprived of the advantage of a clear head, and a mind stored with a knowledge of the improvements and discoveries of the age. It is plain, therefore, that the public are directly interested in securing a liberal compensation for the physician's services. It is to country practitioners mainly, though not exclusively, that these remarks are applicable. For there, we generally find men who have spent but little time or

money on their education, whose expenses are light, who neither read nor think, who can thus afford to practise for small fees, and who control, to a greater or less extent, those of their better educated and more skilful competitors. Closely related to this subject, is the idea entertained by many patients, that a service which requires but little time, and perhaps not much thought, ought to be done for a correspondingly small fee, not appreciating the fact that the *ability* to do it well was acquired by a large expenditure of time and money, and perhaps years of unrequited labor in hospital service. An instance just occurs to me, which will illustrate this. A farmer, to whom a dollar generally appears as if seen through a lens of considerable power, applied to me with a very deep and painful abscess in the palm of the hand. There was nothing to be done to save the hand from serious injury, but to cut deeply down, almost to the bone, which was accordingly done, the operation requiring perhaps ten seconds. When the pain had subsided, he inquired the price, which was small compared with our city fees. It was easy to perceive, by the falling of his lower jaw, and the general elongation of his visage, that something had disagreed with him. I said, "You think the charge high?" "Well, I don't like to complain, but it does seem 'rather steep.'" I then took from a shelf a preparation of a hand, with its arteries, veins, nerves, tendons, etc., all running, in close proximity, through the very space into which the knife had just passed, and convinced him very soon of the responsibility which a surgeon must incur in making this apparently simple and rapid operation. He departed a "wiser if not a better man," and well satisfied, apparently, that he had gotten off so cheaply.

There is a greater or less community of *interest* between the liberal professions, and yet, from a *want of a proper understanding*, *of a proper association among them*, they have always held a sort of antagonistic relation, more or less damaging to each, but especially so to ours. I include, among these professions, the *press*, which, from the ability and education of its managers, and the influence it exerts among the educated classes, as well as others, has a right to be so considered. Some of our most important duties bring us, or should bring

us, into close relations with the *clergy*, a coöperation with whose labors, and joint occupation of a portion of whose field, would assist us in the prevention of disease and crime, especially the crime which is becoming so common among all classes of society, and which really threatens to depopulate, as well as to demoralize certain communities, especially as regards their native American element. Here, the joint labors of the two professions have already, to a degree, been enlisted in New England, and, it is hoped, with some success. A closer association between these professions may also lead certain individuals of the clergy, unfortunately too numerous, to a better appreciation of the great injury which they inflict on the community by their recommendations of useless and injurious *nostrums*, of the composition of which they know nothng, thus unwittingly leaguing themselves with the worst species of impostors, whose senseless and immoral placards, in colossal letters, not only meet us at every corner of the street, or every turn of the road, but have defaced our most magnificent scenery, on the great lines of travel, and at all points of especial interest or beauty, from the Atlantic to the Pacific. It might also prevent what certain religious organizations have recently, with mistaken zeal, been endeavoring to do in Cincinnati, to thwart the praiseworthy efforts of the Board of Health toward the mitigation of a social evil, which the experience of the last half-century has shown to be an irremediable one in all communities, and that prohibitory legislation, which these clergymen are seeking for, is worse than useless, as it was in the case of spirit-drinking. Of the history of this evil, of such vital importance to the moral and physical condition of society, and of the investigations, the experiments, and the struggles of medical men in all countries, to overcome or palliate its evil consequences, the clergy have no right to be ignorant. It is more their province than ours, and now this ignorance, or deep-rooted prejudice, equally to be deprecated among so important a constituent of society, finds them arrayed against us, instead of standing with us, shoulder to shoulder.

Our relations with the press, though much improved of late, are evidently very different from what they should be, as is

evidenced by the readiness of its writers to seek occasions to parade conspicuously in their columns any of our differences of opinion, which must of necessity arise in all professions, or to put the worst construction upon all charges made against us, from the most irresponsible sources, or to launch at us the ever-ready shaft of ridicule. "If the relations between the profession and the press were cordial," says my predecessor, Dr. Hewit; "if there were a correct understanding between the learned doctors and the able editors, and if they both had passed together through the same system of preliminary education; if the ethics of medicine were understood, and their personal relations those of a good and established society, would it be possible for the press, with a few honorable exceptions, to seize every occasion to disparage the legitimate profession? Would it be so reserved in its award of praise, so liberal in its application of censure? But, still worse, would these able, accomplished, refined, elegant, and witty gentlemen sell their space for public announcements, in unmistakable terms, of offers to perpetrate crimes which strike at the root of society, which undermine public health, which corrupt social morals, which relegate our era to the foulest periods of Assyrian, Babylonian, and Græco-Roman decomposition; which degrade our manners and civilization below Herculaneum and Pompeii, and sink them to a level with Sodom?"

The benefits of sanitary science, however, have been so conspicuous of late, as to compel a recognition of our claims to some appreciative notice. But, however great our past services, whatever the amount of life saved the city, and trade retained by our timely admonitions and laborious precautions, let one unfortunate divergence of opinion occur among us, concerning some intricate problem of State medicine, or some error of judgment get publicity, and the ever-ready arrows of wit and sarcasm, for which we have been made the mark in all ages, are showered upon our devoted heads.

With our brethren of the *legal profession*, especially since the rapid development of State medicine, our relations have become so intimate, our paths so parallel, that the necessity for a more or less close community of thought and action has made itself apparent to both professions; and, already, a

"Medico-Legal Society" has been formed in this city, for the purpose of drawing us together in closer bonds of union, and to determine upon questions involving a knowledge of both law and medicine, which combined knowledge it is impossible for either to possess in a degree sufficient for practical employment. The "cramming" on a medical subject, which a lawyer undergoes, to prepare himself for a particular line of medical interrogation before a court, being just sufficient to enable him to appear very learned in medical matters to the jury, perhaps even to the judge himself, and also to confuse a medical witness, who has neglected to brush up for the occasion, and who fails to see that a want of precision in the question itself, caused by a want of precision in the knowledge of the counsel, has involved him in the difficulty of framing a proper answer, but is not sufficient to enable the lawyer to appreciate the true import of the various medical facts presented, or the bearing of the various medical theories which may be adduced as rebutting evidence by the opposing counsel. But, by a frequent participation in the discussion of questions coming before this Society, physicians may become, in a measure, trained as medical experts, and cease to cut the sorry figure which they too often do before the courts; and lawyers may in time acquire a more general and practical knowledge of physiological and pathological principles, and cease to have their judgment warped and their eyes blinded by the imperfect and undigested accumulation of facts, hastily drawn from various sources, to serve the exigencies of a particular case. But far more important objects than even these are the aim of such an association, to which time will now scarcely permit an allusion: The whole subject of *insanity*, in its relation to medical jurisprudence; the harmonizing of its various forms, especially of those new forms which have been invented or discovered within a few years, on some occasions, seemingly to meet the requirements of a desperate case, when no other cause for justification or palliation could be supplied by the ingenuity of counsel; the advocacy of which extraordinary forms of mental alienation, by medical men, has led the public to impugn the purity of their motives, and to suspect undue sympathy for the prisoner, or, worse, undue influence on the part of his counsel or

friends, and which threatens even entirely to thwart the ends of justice in criminal cases, especially when high social station and wealth are arrayed against the State. The future disposal also of such persons as have escaped punishment through such means has already been discussed, and is to be brought before the Legislature. The *care and the education, and final disposition of such foundlings and illegitimate children* as escape death in our foundling hospitals and similar institutions. Statistics show that, even when legislation provides for all possible care of such individuals, still the qercentage of crime and legal punishment among them is decidedly greater than among the more favored classes. But the discussion of these important topics must be left for a more suitable occasion. I merely give a hint of the scope of medical science in this important direction.

Another means of improving the status of professional acquirement, and the success of medical practice, is *the greater utilization of our various hospitals and other eleemosynary institutions.* There is great room for improvement here. The object of the establishment of these institutions, as well as the duties of their officers, I take to be twofold: first, to give the inmates all requisite care and attention; secondly, to give the profession, and, through them, the public, the benefit of whatever experience, whatever valuable information, they may acquire in the performance of their official functions. Any incumbent who fails to perform this latter duty fails to meet the responsibility imposed on himself by accepting such a position. There is only one way of performing this duty, that is, by making his experience the common property of the profession, by the publication, from time to time, of such statistics and cases as he judges to be of sufficient value, or such views of pathology or treatment as may be suggested by them. Without these, the public, who support these establishments by enormous sums, levied in the way of taxes, and by charitable contributions, get not half the value of what they pay for. Now, how many of us, who hold these important positions, meet this reasonable demand? Very few indeed. There are some who hold not only one, but several of these appointments, who seldom or never vouchsafe an item

of information to the profession. In fact, in some instances, it is simply impossible for them to do justice to all the duties which they undertake. But, in a majority of cases, it is possible. It is obvious, then, that these appointments should be more distributed among the profession, and that more discrimination should be exercised in their distribution. On you, therefore, gentlemen, and I may say, too, ladies of the laity, to whom is intrusted in many instances the power of appointments in these institutions, rests the heavy responsibility. If you are guided by personal feeling or friendship entirely in your selection, or even by a knowledge of the fact that your choice is possessed of great ability, of great reputation, perhaps a large private practice, evidencing the confidence of the public, you fail to do your duty. Proper inquiry among the different members of the profession might satisfy you that, with all these desirable qualifications, he is unfitted. Very marked ability, extensive acquirements, and a successful private career, are not necessary, but public spirit, industry, energy, ambition to do something more than merely accumulate money, are.

Our worthy mayor, in a recent address at the opening of a fair in aid of the establishment of another great charity in this city, justly distinguished the latter as the "City of Charities." To the credit of the city be it said, and I wish that my words could go beyond these walls, to the ears of those individuals, and those editors living in distant localities, who are so fond of holding us up as the personification of all that is vicious and corrupt, that in no city, perhaps, in the world, are there so many institutions for the relief of all manner of human suffering and infirmity, such a variety of organizations, public and private, such a rapid multiplication of these organizations, and such a readiness to respond to the calls of charity, whether they come from our immediate neighborhood, from distant parts of our own country, or from the remotest regions of the earth, whether from the sick and wounded of the conquerors, or those of the vanquished. That wonderful organization, the Commissioners of Charities, have alone, in this city, daily to care for some eight thousand of the destitute, mostly sick or infirm. Now, let us look to it, ladies and

gentlemen, for there is no distinction of sex in this good work, and in this responsibility, that all this noble display of one of the prime Christian virtues, this grand effort to respond to the calls of humanity and Christianity, is not crippled and circumscribed by a failure, on *our* part, to comprehend the most important of its details, the proper selection of its true executive officers.

Let us pause, in this connection, to drop a tear over the recent decease of the first and the noblest of the charities of New York, my hospital *Alma Mater.* You all remember—what New-Yorker can forget?—the ivy-mantled pile, with its neatly-kept grounds, and avenue of majestic elms, which greeted and refreshed the eyes of those who approached Broadway from Pearl Street. It was there when you were born—ay, and when our national independence was born. From the year 1770, when "George III., by the grace of God, of Great Britain, France, and Ireland, King, Defender of the Faith, sent greeting to his loving subjects, Peter Middleton, Samuel Bard, and John Jones, *physicians*," has this institution been the pride of the medical profession, and the well-loved refuge for the sick, and especially the wounded of the State. Until recently, it was the greatest school for practical surgery in the country, and I may truly say, in some departments, the best school in the world. It was here that our greatest physicians employed their skill, and established their reputation. It was here that some of the greatest surgical triumphs of the world were achieved. A long list of illustrious names adorn her medical and surgical register—Mott, Wright Post, Alexander Stevens, and a host of others, worthy successors; while, among her trustees and governors, are the names of many of the oldest and most distinguished families of the State, names that will always be recognized by one acquainted with our early history. And yet, *mirabile dictu!* the representatives of those names, the conservators of this renown, have surrendered, without a struggle, this grand old structure, almost the only land-mark of the olden time, in the midst of a continued career of usefulness, to the greed of Mammon, to the spade and pick-axe of modern Vandalism. For a complete history of this extraordinary proceeding, I would refer you to the ad-

dress of my friend Dr. George A. Peters, before the Alumni Association of the College of Physicians and Surgeons, soon, I hope, to be published.

Education, one of the most important questions—considered by many physicians the most important question—bearing on medical improvement, must, of necessity, be very briefly discussed. A considerable portion of the very able address of Dr. Hewit, before this Association, two years ago, was devoted to this subject, and very radical changes in our system were strenuously urged, as they have been by others, especially in England, where the requirements are already far higher than in this country. Undoubtedly, a higher grade of education, as a preliminary to admission to medical lectures, and a longer course of medical study, as a preliminary to graduation, and perhaps also a connection with some hospital or dispensary, as a necessary preliminary to private practice, are requirements much to be desired. But it seems to me that in a country like this, changes in our educational system, to be effected safely, must be effected slowly; *festina lente*, hasten cautiously, lest, in attempting too much, we may lose something of what we have already gained. Consider its prodigious growth—whole States in the West equalling, and even exceeding in size, European principalities and kingdoms, spread over, occupied, and civilized, within a few years, by our own Eastern populations, and by immigrants from the Eastern hemisphere. These populations must have their medical attendants. If they cannot have regularly-educated physicians, with their diplomas in their hands, their places will be occupied by charlatans, and their prescriptions by the *nostrums*, whose advertisements are seen at every cross-road and blacksmith's shop in the newest settlements. Well-educated physicians, from our large schools and cities, will not go into these places; and these schools, more or less remotely situated, are not accessible to the men who must act in their places; they have neither the time nor the means to go through with a *curriculum* of study in an expensive city, with the cost of travel to and fro. But they are anxious to learn what they can, and it seems preferable to have a moderately-educated physician, with a certain *morale*, and responsi-

bility involved in the possession of a *diploma*, than an irresponsible charlatan. The assertion, "Knowledge is power," has so long and so often been made, as to be generally accepted as a fact. But does knowledge, *per se*, confer power? May not an overplus of knowledge, on the contrary, impair power, by crowding out thought, originality, mental independence? The Duke of Wellington once remarked to one who was praising the splendid education of a certain officer, "Yes, he is educated beyond his capacity." Knowledge, in its proper application, *is* power. Now, suppose we concede that a *liberal education* shall be requisite to a medical matriculation, who is to decide what a liberal education means? Just now, even in this age of change, of revolution, nothing is in a greater state of chaos and revolution than the subject of education in general. While some are clamoring for a thorough instruction in the classics, many of the best classical scholars in England are for abolishing them altogether; while two eminent authorities in Great Britain and here, Prof. Huxley and Dr. Barnard, say, and with good reasons too, that our whole previous system of education is wrong, that we have actually been commencing at the wrong end, and giving the studies of adults to children, and *vice versa*. It would be difficult to say where, in this country, a real, genuine liberal education, such as would best fit a man for the practical duties of life, morally, mentally, and physically, which should be the end and aim of all education, is to be had. It is equally difficult, according to Prof. Huxley's evidence,[1] to find such a place in England. So, until we can settle the question as to what a liberal education is, and where it is to be had, we had better not insist on our candidates wasting time and money, which few have to spare, in making the uncertain experiment. Nevertheless, that a very gradual but progressive improvement in our medical colleges, especially in our larger cities, to which others look for examples, is needed, cannot be denied. But it is only to be accomplished by the institutions themselves, acting, not individually and spasmodically, but collectively and uniformly.

Our relations with the *fair sex*, with respect to the medical

[1] "Lay Sermons, Addresses, and Reviews," Thomas Henry Huxley, 1871.

department of woman's rights, I regard as having been practically settled, and need not detain us. Our principle is to submit every thing reasonable to the test of experiment, and this great movement of our female population must submit to that test. So far as we legitimately can, so far as the struggle is kept within the bounds of decency and common-sense, the profession will aid rather than obstruct the experiment. Our relations with the *colored element* of our population, now seeking education and admission into the professions, is, in the future, likely to give us more trouble. Having spent the half of my adult life within the area of slavery, and the other half within that of freedom, my convictions are strong on the merits of this question, and I regret that the limit of this discourse, already exceeded, prevents its discussion.

Our relations with the public being of so intimate and important a character, as we have endeavored to indicate, it seems eminently proper that we should interest ourselves more in public affairs, and, if necessary, to make our influence properly felt and appreciated, we should not disdain even to enter the political arena. We should oftener see medical men, and representative men, in our legislative halls than we do; it is absolutely necessary that there should be a few well-informed physicians in all public bodies, to whom is intrusted the regulation of the internal affairs of States, or municipalities, in order to keep them fully instructed with regard to the merits of the various questions bearing upon the respective interests of the profession and the public, which are constantly occurring. It is so in other countries, and there is no reason why we should form an exception. The good which has been effected, and the evil which has been averted, on several occasions, in our legislative assemblies by the few physicians who have found an entrance there, encourage us to make an effort to increase rather than diminish the number, and to favor rather than attach professional odium to such of our fraternity as evince a desire to make politics a study, and to get an occasional pull at the wires which regulate the governmental machinery, and which ought to be no longer controlled by all other professions and interests of the body-politic save by ours. If, as has recently been stated, there are seventy-five thousand

physicians in the country, and an increase of near two thousand a year, and each of these, as we know, has a more or less important influence among his circle of acquaintance, there is no reason why their power should not be felt in the political world, especially as this power has always been exerted, indeed, can only be exerted, as I have been striving to demonstrate, as well for the public as the professional welfare.

Perhaps the extra-professional portion of my audience, those not thoroughly acquainted with the secret history of a physician's life and work, may imagine that professional zeal and enthusiasm have led me to exaggerate the benefits which society and the State have derived from medical science and her votaries, and the claim thereby established on our part for their favor and support. Far from it. On the contrary, I ought here, and in conclusion, to apologize to the profession, after having called the attention of the public to the subject of our relations with them, for not presenting it in a more forcible manner, for omitting perhaps the most illustrative examples, which have, no doubt, during the progress of my discourse, presented themselves to the minds of some of my professional brethren. But I have alluded only to such instances as have suggested themselves while writing amid the cares and constant interruptions of business, without aiming to be exhaustive of the subject, which would probably have resulted rather in exhausting your patience, for which I return my grateful acknowledgments. Of this, however, be assured, that a physician while engaged in his work, whether it be by the bedside of the wealthy and the influential, or ministering at the pallet of the beggar, whether on the field of battle amid the roar of cannon and the whistling of bullets, in the darksome and noisome cellar and garret, where lurks the concentrated poison of typhus, whether in the ice-bound regions of the poles, or in the pestilential swamps and jungles of the tropics, wherever the calls of duty, the demands of humanity, enthusiasm for discovery, or the interests of science find the physician, he is, for the time, at least, wholly forgetful of self, totally oblivious of danger, of the hope of reward of all save the interest inseparably attached to his work, or the

responsibility resting upon him, and the single purpose to meet that responsibility.

And allow me to say to you, my professional brethren, in bidding you an affectionate farewell for another year, that whether we gain or fail to gain fame and money in this world, whether we reap the just reward of our public labors of our charities, of our devotion to the State, and of the individuals whose lives and health constitute our more immediate concern, whether we ever succeed in elevating the minds of these individuals to a just appreciation of our profession, or of ourselves as its members, let us remember that our labor is not lost; that the consciousness, at the last, of having made the effort, of a noble duty well performed, is itself a reward, one too which comes at a period of our lives when it can be best appreciated; when the acclamations of the public, or the commendations of friends, and even the more solid meed of wealth accumulated, have sunk into comparative insignificance; when, in the twilight of our existence here, the time draws near for us to render our account to the greatest of all Physicians, and we feel as if we had some hope that He, in His mercy for our many faults of omission and commission, may utter the final sentence, "Well done, good and faithful servant!"

Art. II.—*On Hypodermic Injections.*[1] By Thomas J. Gallaher, M. D., Pittsburg, Pa.

The discovery of the important method, known now as the hypodermic method—a name first given it by Mr. Charles Hunter, of St. George's Hospital—is justly due to Dr. Alexander Wood, of Edinburgh. This gentleman, having read many years ago a work on the nervous system, by Valleix, was deeply impressed by certain facts which this work elaborately illustrated. These facts were, that there are four points in the course of every sensitive nerve more liable to neuralgia than the other portions. The location of these points is as follows: 1. The point of the nerve where it emerges from its

[1] Read before the Bedford Medical Club.

bony encasement. 2. Where it traverses the muscle. 3. At the peripheral termination of the nerve; and 4. At that part of the nervous cord where it approaches nearest the surface of the body. Reflecting on these facts, Dr. Wood came to the conclusion that since neuralgia was a local affection, occurring always in one or other of these locations, it ought to be treated by local remedies applied directly to the seat of pain. About this time the instrument for injecting aneurismal nævi with tincture of iron was invented by the late Dr. Fergurson. Some time afterward, while Dr. Wood was using this little instrument to inject a nævus on the head of a child, the happy thought struck him that a syringe constructed similarly to this one was the very thing he needed to confirm his views as to the treatment of neuralgia by narcotic remedies, namely, of treating the disease by passing the medicine through the skin and tissues directly to the point of the nerve affected. After modifying the instrument an opportunity for testing his theory soon occurred. An old lady, eighty years of age, suffering from cervico-brachial neuralgia, was his first patient. An injection of thirty drops of a vinous solution of morphia on the shoulder at the sensitive point gave almost instant relief, and soon put her to sleep. Next morning at the doctor's visit she was still asleep, but was easily aroused. This one injection, although it caused at the time some alarm, entirely cured the patient of her neuralgia. This was in 1843. From this period the injection of opium and some of its preparations for the relief of neuralgia became extensively known and practised in and around Edinburgh. The first notice of this operation of which we have any knowledge is given in the August number of the *British Medical Journal* for 1858. In this paper, written by Dr. Wood, full details of the operation are given, and two cases are narrated in which it was successfully employed. Up to this time neuralgia seems to have been the only disease treated in this manner.

After Dr. Wood, Mr. Charles Hunter, of St. George's Hospital, is the most deserving of credit for the zeal and perseverance he manifested in establishing the hypodermic method of administering medicines on a durable base. He not only employed it in neuralgia, but extended its use to other affec-

tions. Cases of sciatica, chorea, tetanus, wakefulness, puerperal mania, and rheumatism, he treated by this method with the most gratifying results. He also directed his attention to the employment of other remedies besides the opium preparations, and thus other substances, as atropia, strychnia, etc., were found suitable remedies to be employed in this way. Having observed in a few cases painful abscesses following the repeated injection of a remedy at or near the same spot, Mr. Hunter was induced to inject the narcotic at some distance from the seat of pain. To his surprise, the relief afforded was as prompt and effectual as when injected on the irritated nerve. Further experience satisfied him that certain views entertained by Dr. Wood, as to the necessity of localizing the remedy in curing neuralgia, which views had even prompted him to the discovery of the method itself, were erroneous. He found that morphia or any of the preparations of opium, when injected into the subcutaneous cellular tissue of any part of the body, was just as certain and speedy in relieving pain and spasm as when inserted into the very centre of the neuralgic affection. This discovery, apparently so trivial, is indeed one of great importance, for it not only demonstrates that narcotic medicines exert their tranquillizing power through the great nervous centres, but also gives a chance to the operator to vary the seat of puncture, and to select the safest and most convenient parts of the body for the operation. At this period a controversy of a somewhat acrimonious character arose between these gentlemen as to the relative merits of their respective views and observations. This controversy at this day does not concern us. Facts alone are what we seek. The short history already given establishes beyond question that the discovery of the hypodermic method belongs alone to Dr. Wood, but that Dr. Hunter is entitled to great credit for extending its employment, and establishing certain facts in relation to it by which its usefulness is vastly enlarged.

As to the observations alluded to, in which these gentlemen differ as to the effects of a remedy, whether injected at the seat of pain or elsewhere in the body, many eminent men differ in opinion. A scientific committee, appointed in Great Britain to report on the therapeutic effects of remedies hypo-

dermically injected, give it as their opinion that no difference has been observed in the effects of a drug subcutaneously injected, whether it be introduced near to or at a distance from the affected part. Other physicians of experience and eminence have expressed a like opinion. On the other hand, Dr. Ruppaner, of New York, Eulenberg, and others, believe that a narcotic solution injected at the seat of pain will be followed by effects greater and more durable than when introduced at a distance from it. From a consideration of the facts brought forth to establish these respective positions, and from my own experience, it appears to me certain that, to a considerable extent, both these contestants are right and both wrong. That morphia injected into the arm will relieve a *tic*, sciatica, or pure neuralgic pain anywhere, no one with any experience will deny; but that, when injected locally, it *sometimes* gives more permanent and complete relief than when introduced at a distance from the pain, is a fact established by equal authority. Instances also are not wanting to show that a failure to effect a cure by the latter procedure may be completely successful by a resort to the former. Hence it follows that it makes but little difference as a rule where the therapeutic agent is deposited, so far as the remedial effects are concerned, but individual cases may present in which a preference as to the spot for puncture would be proper, but the utility of this selection will depend alone on the experience of the operator.

The hypodermic method of giving medicine is now so well established that no practitioner of any standing will denounce it or refuse to avail himself of its advantages. Medical periodicals are teeming with its triumphs, and medical men in all parts of the world are engaged in extending its usefulness. To call to your notice some of the facts made known to us respecting this method of administering medicines, together with a short notice of the remedies employed, is the purpose of my present paper. At the end I propose to give a few cases in which I have used morphia in the treatment of cholera morbus and dysentery with success—diseases to which, so far as I am aware, this treatment has not as yet been applied.

Medicines employed hypodermically.—The chief medicines employed in this way are the alkaloids, but extracts, tinctures,

and infusions, are also used. The following list comprises some of the most important: All the preparations of opium of which the salts of morphia are the chief, atropia, quinia, strychnia, digitalin, aconite, extract and tincture of cannabis Indica, and extract of Calabar bean.

Doses.—The dose is from one-fourth to one-half of that usually given by the mouth. Men bear a larger dose than women, and the adult of either sex can take a proportionately larger amount than children, especially if the remedy be a narcotic. In nervous subjects unused to drugs, particularly among women and children, the smaller should always be tried first, and then increased as the patient is found to bear it. In children disastrous results might follow unless great caution be taken to begin with a minimum dose.

Point of Insertion.—Some advantage is gained and danger oftentimes averted by selecting the proper place to insert the remedy. Parts of the body supplied by numerous superficial veins should be avoided, and also those containing varicose blood-vessels. The arm, near the insertion of the deltoid muscle, is probably the safest and most convenient. The thigh, abdomen, breast, back, and shoulder, may in turn be chosen, provided they be not covered by superficial blood-vessels. The foot, ankle, wrist, hand, and forearm, should as a rule be avoided, because of their abundant superficial vascularity. The injection of a powerful narcotic, as morphia, directly into a vein, an accident which might occur from a disregard of the intimations above given, would be quickly followed by alarming, and probably fatal effects.

Advantages of the Method.—Some of the advantages of this method are: 1. It is as safe as any other plan of giving medicines. Instances are upon record of persons having been injected with morphia hundreds and even thousands of times. Prof. Nussbaum, of Munich, was injected 2,000 times before an accident happened him, and this not a fatal one; and a physician in this city, laboring under a painful affection of the heart, has been operated upon over 1,400 times, without the occurrence of an unpleasant symptom, beyond the production of two small abscesses, or rather pustules, on the arm. In one patient under the care of the writer, a solution of sulphate of

morphia was injected over one hundred times without producing even a pustule. 2. Medicines act with more certainty and promptness. The full effects of a remedy whose action is chiefly confined to the nervous system are felt in from five to fifteen minutes. This rapidity of action is of some moment in many painful and dangerous diseases, as neuralgia, convulsions, and congestive chills. 3. They are more permanent in their effects. Instances are on record of neuralgia, which had resisted the influence of morphia and other remedies given by the mouth for years, having been perfectly cured by one or two subcutaneous injections of morphia. 4. When the remedy to be employed is scarce or costly, its hypodermic use is of advantage on the score of economy. 5. The pure action of the drug is thus obtained. Medicines passing along the alimentary canal often fail in producing their usual therapeutic effects, and this failure is frequently owing either to non-absorption through the intestinal coats, or to a change in their composition from the material with which they come in contact in their passage. No such failure of therapeutic action can occur when they are injected into the cellular tissue. In this event, the pure action of the drug is alone experienced; and, 6. Medicines can be given hypodermically when, from irritability or disease of the stomach and rectum, or from other causes, their administration through these channels would be inadmissible or impossible.

There are, however, some disadvantages, such as sudden sinking and prostration, nausea and vomiting, itching of the skin and nose, and painful abscesses, which are enumerated as occasional results of the hypodermic method. Death itself is said to have even resulted. Sudden sinking and prostration after the injection of morphia are no doubt the result either of an overdose having been employed, or the injection of a portion of the fluid into a vein. The accident to Prof. Nussbaum was probably of the latter kind. An instance of sudden and complete prostration, lasting over twenty-four hours, from an overdose of morphia, happened in the practice of the writer. Accidents from overdoses can of course be avoided by giving proper attention to the rules of administration already commented upon. The injection of a vein is a serious

matter, and ought to be avoided by all means if possible. It is thought this accident cannot occur if, after puncturing the skin, the needle be slightly withdrawn, and the fluid then slowly and gently injected. Nausea and vomiting sometimes occur, but are generally owing to an overdose. These symptoms are more frequently produced by the stomachic exhibition of morphia than by its hypodermic. Abscess following the puncture is another disadvantage. Some medicines produce this condition more frequently than others, and some are so apt to cause it as to render their employment impossible. Even chloroform is so apt to be followed by it that its injection is condemned except in urgent cases. The salts of morphia seldom produce this accident, and the other preparations mentioned only occasionally. In these latter it can mostly be avoided by changing the seat of puncture from time to time. This accident, when it does occur, is not ordinarily a serious one. I have injected morphia, atropia, and quinia, singly and combined, the first one hundreds of times, and have as yet seen no troublesome abscess.

I now come to the consideration of some of the remedies employed hypodermically in the treatment of diseases.

Strychnia.—This alkaloid will first command attention. It may be dissolved in water, slightly acidulated, and injected with safety, in doses varying from $\frac{1}{30}$ to $\frac{1}{60}$ of a grain. It has been given with success in various forms of paralysis, especially paraplegia, after a failure of it and other remedies given by the mouth. Dr. Anstie found it of great use in gastralgia, and Dr. Barwell gave it with success in severe forms of local paralysis.

Aconitia is but little used. It has been employed in tetanus with some success, in doses of $\frac{1}{30}$ to $\frac{1}{15}$ of a grain.

Calabar Bean.—This important and powerful sedative has been recommended by Dr. Fraser in tetanus. He recommends its employment both by the stomach and by the hypodermic syringe, and reports success in nine out of eleven cases treated. One-third of a grain of the extract, dissolved in from 10 to 15 minims of water, and this neutralized if necessary by the addition of a little carbonate of soda, is the proper dose to begin with. The injection may be repeated every two or three

hours, and gradually increased in strength to two or three grains or more, until the full physiological effect of the drug is produced, or until nausea and vomiting compel its discontinuance. Dr. W. Haining (London *Lancet*, March No., 1870, Am. edition) reports an interesting case of tetanus cured by the hypodermic injection of the extract of Calabar bean. He resorted to this method in consequence of inability to give it by the stomach. He commenced with one half-grain at a dose, and increased this after a time to six grains, repeating it from seven to nine times daily, and continued at this for a period of several weeks, before the disease permanently yielded. The tetanic spasm generally subsided in from five to seven minutes after each injection, to return in a few hours. A cure was finally made. It does not appear certain, from such experience as we can gather, that the hypodermic injection of the extract or tincture of Calabar bean in the treatment of tetanus has any advantage over its exhibition by the mouth, when this can be accomplished, but cases occasionally occur in which, from the violence of the spasms, or from other causes, the medicine cannot be given by the stomach, when its exhibition by the syringe becomes a matter of necessity.

Atropia.—Atropia has recently obtained a high position in therapeutic medicine. Its stimulating effect upon the organic nervous centres, and its opposite action on those belonging to the cerebro-spinal system, have called for its employment in a wide circle of diseases. From the rapidity and effectiveness of its action when injected into the cellular tissue—requiring only from five to fifteen minutes to produce its full effect—a resort to this method in sudden paralysis of the heart and convulsive affections becomes a matter of the utmost importance. From $\frac{1}{48}$ to $\frac{1}{24}$ of a grain of the sulphate is a full dose. Oppolzer, Courty, and Bartholemew, employed it with success in spasmodic asthma. Its virtues appear to be enhanced, according to the latter author, by adding $\frac{1}{4}$ or $\frac{1}{8}$ grain of sulphate of morphia to each dose. Given in advance of the paroxysm, it often prevents its occurrence. This combination is also found of great use in the paroxysms of dyspnœa, accompanying emphysema and mitral disease (*Bartholemew*). Chronic inflammation of the lungs, or simple bronchitis, ac-

companied by a copious secretion of mucus, is greatly benefited and often radically cured by the frequent injection of small doses of this compound solution. In acute pleuritis, rheumatism, and gout, it has also been used with great advantage. In the epileptiform, hysterical, and puerperal convulsions, as well as in the various spasmodic affections of children, atropia alone is of great value. Neuralgia in different parts, especially when confined to the pelvic viscera and the sciatic region, is quickly relieved by the injection of atropia. Even tetanus is said to have yielded to its potency. That form of angina in which but little or no organic disease of the heart or great blood-vessels can be detected, is often much relieved. In threatening glaucoma and iritis, atropia is a most valuable remedy. Dr. Anstie assures us that he has averted two cases of incipient glaucoma by the daily injection of $\frac{1}{60}$ of a grain continued for some time. Nocturnal epilepsy, and what the French call *petit mal*, are also often cured by the same daily process.

Quinia.—Quinia is another article which has engaged the attention of the hypodermist, and its value as a remedy, when injected subcutaneously, is attested by many eminent authorities. Chasseaud of Smyrna, Moore of Bombay, Eulenberg of Germany, Arnould of Algeria, Maury of Mississippi, and many others, speak of its use in the malarial fevers incident to their respective districts in terms of the highest commendation. From these authorities it would appear to be more speedy, effective, and permanent in its curative results, than when given by the stomach. Besides, it may be employed in this way when, from gastric irritability, insensibility, or other causes, its successful administration could not be accomplished through other channels. The hypodermic dose is from two to eight grains dissolved in a few drops of water, to which as much acid should be added as will make the solution clear. It should then be filtered. Both the sulphate and acetate are employed. From two to four grains of this salt injected a few hours before the recurrence of a chill, in intermittent fever, will not only prevent the expected paroxysm, but often, when the patient can be removed to a healthier district, effect a perfect cure. However, a repetition of the operation, daily or less often, for some

time, is generally demanded in conjunction with other remedies if required, before a permanent result is obtained. In remittent fever a similar dose given some time before the febrile exacerbation will exert as great a febrifuge effect as, if not greater than, when given by the mouth. But, in that form of miasmatic disease known as pernicious or congestive chill, this remedy is of the greatest value. Eight grains thrown into the cellular tissue shortly after the onset of the chill will often bring the paroxysm to a happy and speedy termination. In this affection its use is particularly demanded—1. Where it cannot be given by the stomach or rectum; 2. Where the violence of the disease is so great as to threaten speedy death; and 3. Where there is a scarcity of the drug.

It has also been employed in other diseases not malarial, in which its administration by the stomach would be proper, but here it would be resorted to only when its employment in any other way would be inadmissible. I have used it in several cases coming under this head. In one case of gastralgia with anorexia, vomiting, sickness of the stomach, and emaciation, the daily subcutaneous injection of four grains of sulphate of quinia, and the internal use of small doses of hydrocyanic acid, quickly arrested the symptoms, and soon restored the patient to perfect health. The acid checked the gastric pain and irritability, while the quinia restored the appetite and strength.

Another patient presented symptoms of gastric and intestinal irritability, and perhaps intestinal ulceration, following typhoid fever. She was extremely emaciated, had nausea and vomiting, with loss of appetite, and more or less gastric pains. When these symptoms were relieved, they would be followed by copious diarrhœa, abdominal pain, and sometimes painful micturition. After trying quinia, morphia, hydrocyanic acid, nitrate of silver, bismuth, and many other remedies, with temporary effects, I commenced the daily injection of four grains of sulphate of quinia and one-third grain of morphia. Under this treatment, with a careful regulation of the diet, she began to improve. The sickness, pain, and diarrhœa, soon subsided, an appetite was created, and she is now rapidly recovering her health and strength.

It is well to remember here that, in using a strong solution of quinia, especially during cool or cold weather, the salt is apt to quickly crystallize in and stop up the nozzle of the syringe, and thus greatly annoy both the patient and operator. To prevent this accident, care should be taken to carefully cleanse the instrument with water after each operation, and, as suggested by Maury, to always heat the solution before injecting it.

Ergotina.—This article has recently been injected by Lan genbeck (*American Journal*, January, No. 70), in doses of one-half to three grains, with success in aneurismal tumors. One tumor of the radial artery, the size of a hazel-nut, completely disappeared in eight days after the injection; and another in the neck, as large as a man's fist, notably diminished in size on its occasional employment for a period of six weeks.

Morphia.—I now come to the consideration of the different salts of morphia, remedies of the greatest value, especially when hypodermically employed. The hydrochlorate, acetate and sulphate are those chiefly used, and, judging from the success obtained in the use of each of them by different operators, it seems probable that no preference can be given to any one of them. I have generally selected the sulphate, but have employed the acetate also, with good results. The ordinary hypodermic dose is from one-eighth to one-half grain, though, after the patient has become accustomed to its use, or when the affection is an exceedingly painful one, three-fourths or even one grain, or more, may be used with safety and advantage. As morphia does not agree with every one, no matter how administered, and as it acts with much greater severity on one person than another, especially among females, it is always better, unless we know our subject, to begin with the minimum dose. Morphia, when injected beneath the skin, like the other alkaloids, acts promptly and efficiently, and is less likely to produce sickness of stomach, loss of appetite and headache than when given by the stomach. While now and then we have nausea and vomiting, in the great majority of cases, when the dose has been properly regulated, nausea is removed, an appetite created, and headache relieved. Besides, it does not produce the same amount of costiveness, and, while it

checks diarrhœa and tenesmus, it does not impair intestinal susceptibility to the action of purgatives. In the matter of producing sleep by morphia, its hypodermic action is somewhat antagonistic to its stomachic, for, while sleep generally follows its internal employment in an hour or two, it is often postponed for six, eight or twelve hours after its hypodermic use. Instead of favoring, it sometimes retards hypnotism. As the action of the drug appears different as the method differs by which it is given, it follows that morphia may be employed hypodermically, in certain diseases and conditions, where its exhibition by other methods would be inappropriate.

The diseases in which it may be employed are numerous and important, and first among these is neuralgia. Pure neuralgia, no matter where located, is speedily relieved by the introduction of morphia into the cellular tissue, either at the seat of pain or elsewhere. One injection has been known to relieve it entirely, but generally its daily repetition for weeks or longer may be required before a cure is effected. On one occasion I had the pleasure of curing a confirmed case of sciatica by three injections, which had resisted the ordinary treatment for months.

It has also been employed with success in puerperal mania, convulsive affections generally, and in gout and rheumatism. In strangulated hernia it is of great use in relieving pain and relaxing spasm. Dr. Ravoth has, by its assistance, been able to reduce a hernia by taxis after the usual remedies and manipulations had been unavailingly employed. It is also of great use in asthma. Prof. Hirst considers morphia superior to atropia in the hypodermic treatment of this affection, on account, as he alleges, of the greater permanency of its effects. He recommends the alternate daily employment of these remedies in chronic cases. A combination of the two in suitable proportions has been productive of much good in a few cases treated in this way by the writer. They were cases in which but little cardiac difficulty existed, but where the lungs were highly emphysematous and bronchial inflammation was general. Dr. Joseph E. Garrison (U. S. Army) reports success in several cases of congestive chills treated by him.

In the Pennsylvania Hospital Reports (vol. ii., p. 69), several cases of sunstroke or heatstroke are reported by Dr. I. A. Hutchison, in which morphia by the hypodermic method proved successful. One case, apparently hopeless, and waking in convulsions, was speedily relieved, and soon recovered. In chronic mania and melancholia much benefit has been obtained by the morphia injection, and Dr. C. L. Robertson (*Practitioner*, May No. 69) recommends it in these disorders.

Sea-sickness is another troublesome affection to which this method has been advantageously employed. Mr. Thomas Johnson (*Med. Times and Gaz.*, 1869) reports a case in which immediate relief followed the injection of one-eighth grain of morphia over the epigastrium. The introduction of the medicine in the same situation has been recommended by high authority as a remedy of great value in certain forms of dyspepsia, in which sickness of stomach, loss of appetite, and coated tongue, formed the chief symptoms. The daily injection of one-fourth grain, for a short time, removes the sickness, cleans the tongue, and creates an appetite.

It is affirmed that morphia hypodermically injected prolongs the anæsthetic effect of chloroform administered by inhalation. If this be correct, the discovery is an important one, as it will greatly lessen the danger and difficulties attending the administration of that powerful remedy.

In chronic diseases of the heart and great blood-vessels, diseases over which medicines ordinarily employed are known to exert but little control, there is reason to believe that much benefit will be obtained from morphia thus administered. To Dr. T. Clifford Allbutt (*Practitioner*, December, 1869) we are indebted for a valuable paper on this subject. From his observation we learn that in angina with disease of the coronary arteries, in severe neuralgic pains from the pressure of an intrathoracic tumor, and in mitral regurgitation, it is a remedy of undoubted value, not only in relieving the pains incident to these affections, but in removing the pathological conditions themselves. In pericardial effusion of long standing, associated with chronic pericarditis, it has been used with advantage. Relief of unpleasant symptoms is also obtained in constriction of the aortic and mitral orifices, but in these conditions its re-

medial effects are not so apparent. A physician of this city, whose case has already been alluded to, is now slowly recovering from a painful chronic affection of the heart—probably pericarditis—by the hypodermic injection of morphia. He uses it himself several times a day, to the extent of six or seven grains daily, having gradually increased the quantity to this amount. After months of confinement and much suffering, he is now able to attend to business, and is recovering in health and strength. The cardiac affection seems to have disappeared, and he is now gradually reducing the accustomed dose of morphia.

In nephritic and biliary colic, the hypodermic use of morphia is of incalculable benefit in relieving pain and spasm, and promoting the passage of the calculus through the irritated canal. In flatulent colic it also is a most valuable resort, for, while it effectually relieves the pain, it does not prevent or retard the clearing out of the primæ viæ by the action of purgatives.

In the after-pains of parturition the relief it affords is speedy and gratifying. Sometimes one injection of half a grain relieves at once without future return of pain. In three cases in which I employed it after the use of ergot administered the previous day to facilitate labor, there was no return of pain after the morphia was introduced. It seemed to act as an antidote to the ergot. In the threatening pains of premature labor its exhibition in this way is superior to any other method, as the relief it gives is speedy and generally unattended with unpleasant effects.

In chronic painful affections, as cancer, where death is inevitable, and where relief from suffering is all that is sought for, the injection of morphia into the cellular tissue is by far the most effective means in our possession. While it relieves the most intense agony, it calms the nervous system, and gives such comfort to the unhappy patient as cannot be obtained by other means. During the winter and spring of the present year, I had under my care an elderly gentleman suffering from cancer of the pancreas and liver. The pain of the lumbar, umbilical, and epigastric regions, was most agonizing, as well as constant. After many remedies, including the different

preparations of opium, had been employed, I finally commenced the injection beneath the skin of one-third grain of morphia. The relief obtained was so speedy and complete, that he refused anodyne medicines in every other shape and method of exhibition. The dose was gradually increased to one grain twice daily, and this was continued till his death. The pain was always relieved in from ten to fifteen minutes—sometimes in five—and the effect would last from eight to ten hours. He often expressed the utmost satisfaction, for he was made for a time cheerful and happy.

I have also employed it with marked success in several cases of cholera morbus and dysentery. I append a few cases illustrative of the good effects of the treatment in these diseases:

Case I. *Cholera Morbus.*—Mrs. K., aged thirty years, sent for me at two o'clock A. M., May 30, 1870. I found her vomiting and purging, with severe abdominal cramps. The sickness commenced some hours previously with diarrhœa, followed by the vomiting. The discharge from the stomach consisted of gastric mucus and what she drank—for the thirst was urgent. The alvine evacuations were thin, copious, offensive, painless, and frequent—occurring every half hour or hour, and often a pint or more at a time. She already was considerably emaciated and prostrated.

I injected one-third of a grain of sulph. morph. beneath the skin of the epigastrium, ordered the patient to remain quiet in bed, to use the bed-pan if necessary, and take nothing into the stomach but what she could suck from bits of ice placed in her mouth. In ten or twelve minutes the pain subsided, and the vomiting and purging ceased. I remained an hour, and had the satisfaction of leaving my patient completely relieved. No return of the symptoms.

Case II.—Mr. L., aged about thirty years, a laborer, commenced passing large and thin discharges without pain from the bowels, at three o'clock, P. M., July 30, 1870, and began to vomit an hour afterward. The matter evacuated from the stomach and bowels was similar to what was observed in Case I. Up to the time of my visit, at ten o'clock P. M., same day, he had had fifteen passages from the bowels, and none of these less than a pint in quantity. I found him at that time greatly prostrated and emaciated, with that peculiar husky voice accompanying the advanced stage of severe cholera, and with very severe and frequent cramps in the calves of the lower extremities; pulse 76, small and feeble; temperature 97.7. One-third of a grain of morph. sulph., injected into his arm, quickly relieved his vomiting and purging, and partially checked the spasms.

July 4th.—This morning the patient feels quite well, but weak. He experienced a few pains in the legs during the previous night, but toward

morning they left him. Nothing more was required than gentle tonics and a regulation of food.

Case III.—Mrs. B., aged forty-four years, took diarrhœa in the morning of July 8, 1870, and had three copious stools before noon. After four o'clock P. M. they increased in frequency, so as to occur every half hour or hour. Vomiting set in at six o'clock P. M. She complained of intense thirst, but immediately rejected every thing received into her stomach. The evacuations from the bowels were large, thin, painless, and very offensive to the smell, similar to those in Case I. At my visit in the evening, the spasms of the abdominal muscles were frequent and exceedingly painful, and violent pain and contraction of the muscles of the feet and legs were occasionally complained of. She was much reduced in flesh, with a husky voice, and was apparently sinking. Pulse 100, small and feeble; temperature 100.50.

Quietness was enjoined—nothing allowed but ice—and one-third of a grain of morph. sulph. injected into her arm. The vomiting, purging, and spasmodic affections vanished, as it were, like a charm, and I left the patient in thirty minutes, comfortable and easy. She speedily recovered her strength and health.

Case IV.—Mrs. B., aged twenty-two years, had eaten ice-cream, and supposed it had made her sick. Commenced vomiting in the evening of July 9, 1870, which continued the whole night. Eight o'clock next morning the vomiting ceased, and diarrhœa set in. After the first two or three passages, the discharges were of the usual character, viz., thin, copious, etc., and came on every hour or two during the day. In the evening they increased in frequency, and were accompanied with severe abdominal pain and spasms. Seven o'clock P. M. the patient is much emaciated, pale, feeble, and complains of thirst, great abdominal pain, and exhausting diarrhœa. Gave same directions as in previous cases, and injected the usual dose, viz., one-third of a grain of morph. sulph., into her arm.

July 11th, evening.—The injection of yesterday completely arrested the symptoms for twelve hours. Had two copious and painless operations to-day. Injected one-fourth of a grain of morphia. The relief following this last injection was complete and permanent.

Case V.—John W., aged fifty-four years, was attacked July 14, 1870, with diarrhœa some hours after eating a hearty meal. Had several passages, natural in appearance, but thin, during the day, but in the evening they increased in frequency, and became quite large, thin, and watery, and contained some bits of indigestible food, as seeds of cucumbers, lumps of new potatoes, etc. The diarrhœa continued hourly the whole night. Next morning, July 15th, I visited him; found him much reduced from the persistent and copious purging, and thirsty. Pulse 80. Had considerable abdominal pain and soreness, but no spasms. Injected one-third of a grain of morphia, and gave the usual directions. In two minutes after injecting him, he both vomited and purged, evidently, however, not from the effects of the remedy. From this time the symptoms disappeared, and did not return.

In case one I injected the morphia on account of the abdominal pain, and was astonished to find that it relieved the vomiting and purging as well. In subsequent cases I took advantage of the knowledge thus obtained, and injected the morphia for all the symptoms—omitting all other remedies—even the mustard-plaster so generally employed. The success was beyond any thing hitherto observed by me. The diarrhœa and vomiting in all the above cases ceased at once on the use of the remedy, and in four out of five the pain and cramps also. In one case the purging returned in twelve hours, but was quickly arrested by a repetition of the injection. It should be recollected that all the above cases were persons in the vigor of life, and had healthy constitutions. In delicate and nervous females, and elderly people, the dose should not be as large as the one recommended here. One old lady, seventy-eight years of age, was very much prostrated by injecting into her arm one-tenth of a grain. Now and then we see a case in which the remedy causes nausea and vomiting, and in which it cannot be used. One such case happened to me, in which the nausea and vomiting were increased, but the diarrhœa was checked, by the morphia. In this disease the remedy appears to act, when hypodermically employed, not only by relieving pain and nervous irritability, but by arresting the abnormal secretion of the intestinal glands and checking the propulsive action of the intestinal muscles.

During last summer I treated three cases of dysentery by hypodermic injection of morphia with complete success. I append the three following cases, one from notes taken at the bedside, the others from memory, as illustrative of the treatment:

Case I.—Mrs. D., aged twenty years, eight months advanced in pregnancy, was taken ill, July 3d, with dysentery. I saw her on the morning of the 4th. During the previous night she had had about forty evacuations from the bowels, each passage being accompanied by great pain and distress, and consisting only of mucus and blood. She passed no more than a spoonful at a time. The abdominal pain and tenesmus were constant and distressing. Her temperature was high and pulse rapid, and she had much thirst. I regret the want of notes in this case, as they would show the attack a severe one. From the severity of the case I feared premature labor, and accordingly injected into her arm one-third of a grain of mor-

phia. In fifteen minutes she became calm and easy, and the diarrhœa, pain, and tenesmus, subsided. That day she obtained some refreshing sleep. She remained free from distressing symptoms for eighteen hours, when they returned with their former severity. Next morning, July 5th, I injected morphia, and again with similar relief for about the same time.

In the mean time I ordered her gum-water and other mucilaginous drinks, and farinaceous articles of food, with beef-tea, etc.

July 6th. The injection was repeated, with similar results. Without further detail, I may say that the relief afforded by the morphia injection was so prompt and effectual that I found it unnecessary to resort to any other medication, except one dose of castor-oil, during the progress of the case. The injection was repeated daily for ten days, when there was an entire subsidence of the symptoms, and my patient was able to be about. She was afterward confined at term with a healthy child. The success attending this case induced me to pursue a similar plan in the next.

Case II.—Mrs. R., was attacked with dysenteric symptoms August 22, 1870. Stools every half hour or hour, small, consisting of mucus and blood, and accompanied by pain and tenesmus, and severe pain in the back, pulse 88, temperature 100. This case was a mild one. Ordered quietness, gum-water, and farinaceous food. Injected one-fourth grain of morphia. This gave relief for seven hours of all the symptoms. Partial return of the disease same night. The details of this case need not be given. Suffice it to say that the injection was repeated daily for five days, with the effect of giving almost instant relief each time for from seven to twelve hours. At the end of this time she was discharged cured.

Case III.—Mr. M., aged twenty-four years, just returned from a flying visit to the oil-regions. Taken sick November 9, 1870. I saw him next evening, the 10th. He complained of headache, and great pain and tenesmus, with frequent desire to defecate. The passages, which occurred almost every ten minutes, were small, and consisted chiefly of bloody mucus. Sometimes they were of pure blood. A dose of castor-oil taken this morning brought away some feculent matter, without affording any relief to the patient. Considerable pain across the umbilicus, increased on pressure. Pulse 96, temperature 103.2°. Injected into arm one-fourth grain morphia, with the usual directions as to diet, etc.

November 11th.—Relieved of diarrhœa and pain for over five hours after the injection, also slept some during the night. Toward morning the diarrhœa, etc., returned, though now it occurred only once in two hours. Injected one-third grain morphia sulph.

November 12th.—Remained free from the symptoms for sixteen hours after yesterday's operation. Feels much better this morning, though has had seven stools in the last nine hours. Patient sitting up. Pulse 80, temperature 98°. Injected one-fourth grain morphia.

November 13th.—Has had no movement of the bowels since yesterday's visit. Temperature and pulse same as yesterday. Passes wind freely; feels quite well, but weak. Gave pil. quiniæ and dismissed him cured.

These cases show that not only the pain and tenesmus of dysentery may be instantly relieved by the hypodermic injection of morphia, but the disease itself may be entirely cured without the employment of any other remedy. The cure, too is much quicker than by the usual method, and the administration of frequent doses of nauseous drugs obviated. From one to two injections, mostly but one, daily, is all that is required. I have resorted to this method also in semi-chronic forms of dysentery and diarrhœa, with entire success.

Art. III.—*On Diabetes.*[1]—By Gouverneur M. Smith, M. D., Physican to the New York Hospital.

Mr. President and Fellows of the New York Academy of Medicine: The disease known as diabetes, though recognized as a distinct disorder for many years, and made a subject of philosophical medical research, has still lingering about it many unsolved questions relating to its etiology, pathology, and treatment. It is therefore a malady almost as attractive for our study as though it were a new field of inquiry. Aided by the facts which have been accumulated by predecessors and contemporaries, we are justified in anticipating an early solution of several of the vexed questions to which I have alluded.

The physiologists have partially explained the phenomena of glycogenesis; the pathologists have not as yet been equally successful in describing the conditions favoring glycosuria. As clinical observers are to-day better armed and equipped to investigate the subject, it is but becoming that we should at once proceed to systematically arrange relevant and physiological and pathological facts, and, binding them together with an Ariadnean thread, present an array of truths useful in their practical bearings.

When the term diabetes was employed by the older medical writers, it did not convey the same significance of meaning that it does at the present day. Derived from the Greek

[1] Being an Abstract of a Paper read before the New York Academy of Medicine, February 2, 1871.

διa, *through*, and βαινειν, *to pass*, it simply implied an immoderate flow of urine. A new importance was attached to the expression when Dr. Thomas Willis, of Oxford, about two centuries ago, declared that the urine in diabetes contained saccharine matter.

The advance made by Dr. Willis in his investigation of the subject of diabetes was, however, quite insignificant, and his views in regard to the presence of sugar in the renal secretion were merely presumptive. More than a century elapsed before further light was cast upon it, when Dr. Matthew Dobson, of Liverpool, in 1779, proved the truth of Dr. Willis's hypothesis by extracting sugar from the urine voided by a patient suffering with the disease under consideration.

As excessive diuresis is a prominent symptom in diabetes, it is not surprising that our earlier predecessors attributed the malady to some nephritic lesion; indeed, comparatively little attention was directed beyond the kidneys until the year 1835, when Ambrosiani, of Milan, by detecting glucæmia, showed that the distemper might be either of humoral origin or be the result of lesions in viscera remote from the renal emunctories. It is consequently only within about forty years that pathologists have been very carefully searching for the causes of glycosuria beyond the kidneys, and the reason for their previous remissness in this regard must be partially attributed to their limited knowledge of chemistry and physiology.

The table on p. 552 exhibits the classification of diabetes in various nosologies since the year 1762.

Cullen in 1785 placed the disorder in question in the class neuroses and in the order spasmi. Hosack, in criticising the nosologists who preceded him, remarked in regard to Cullen's classification of diabetes, "I have excluded many of those retained in that class by Cullen, as *cholera*, *diarrhœa*, and *diabetes*, which more properly belong to the class profluvia, or excessive evacuations."

While admitting that Cullen was unfortunate in this instance in the precise nomenclature employed, nevertheless his views regarding diabetes were far in advance of his age, and in some respects agree with those which are now held, and which Hosack overlooked in his own classification of diseases.

Diabetes Mellitus.

Nosology.	Date.	Class.	Order.	Genus.
Sauvages	1762	Fluxus	Serifluxus.	
Linnæus	1763	Evacuatorii	Genitalium.	
Vogel	1772	Profluvia	Apocenoses.	
Sagar	1776	Fluxus	Serifluxus.	
Cullen	1785	Neuroses	Spasmi.	
Darwin	1796	Diseases of Irritation.	Retrograde Irritative Motions.	Of the Absorbent System.
Crichton	1804	Fluxus	Fluxus cum Febre	Diabetes.
Pinel	1809	Læsiones Organicæ	Læsiones organicæ particulares.	Sectio Læsiones organorum uropoieticorum, order Diabetes.
Parr	1809		Profluvia	Apocenosis.
Swediaur	1812	Cachexiæ et Cachochym.	Dyschymiæ.	
Young	1813	Pareccrises	Cacochymiæ.	
Good	1817	Eccritica	Paruria.	
Hosack	1818	Profluvia	Apocenoses	Diabetes.
Metropolitan Bd. of Health, New York.	1866	Local Diseases	Urinary System.	
Royal College of Physicians of London.	1869	General Diseases	Diabetes.	

Guided by the inferences of Cullen, Dr. Rollo, Surgeon-General to the Royal Artillery, about the commencement of the present century, was induced to restrict the diet of diabetic patients, confining them chiefly to animal food, and forbidding the free use of vegetables affording saccharine matter.

It is manifestly impossible on an occasion like the present to allude to all of those whose labors have contributed to elucidate the subject of diabetes. It must suffice to give a brief summary of the views of a few of those physiologists who, by explaining normal and artificially-produced glycogenesis, have thus thrown light upon the processes of diseases favoring the abnormal production of sugar.

As is well known, Bernard, since the year 1848, has from time to time laid his experiments and conclusions before the medical public. He has shown that the liver possessed a glycogenic function ; that the sugar formed did not pass through the hepatic ducts, but was carried off by the blood through the hepatic veins, and could be thence traced to the right side of the heart and to the lungs, but there disappeared, and could not ordinarily be found in the blood of the general circulation. The liver, he likewise has stated, possesses the property of forming sugar after removal from the body. The sugar is

not primarily formed, but is the result, he asserted, of the metamorphosis of a material known as "amyloid matter."

Dr. Pavy, of Guy's Hospital, from his experiments concluded that hepatic sugar generation was a *post-mortem* phenomenon, and that in life the liver possessed no such gift.

Dr. A. Flint, Jr., from a careful series of experiments, has shown that, "during life, the liver contains only the glycogenic matter and no sugar, because the great mass of blood which is constantly passing through this organ washes out the sugar as fast as it is formed; but after death, or when the circulation is interfered with, the transformation of glycogenic matter into sugar goes on; the sugar is not removed under these conditions, and can then be detected in the substance of the liver."

This phenomenon occurs irrespective of the chemical nature of the food taken, but is the more remarkable when the aliment ingested has been of an amylaceous character.

Dr. William T. Lusk has recently shown—

1. "That the blood of the general system, in carnivorous animals confined to a nitrogenous diet, contains appreciable quantities of glucose, not only during the period of digestion, as admitted by Bernard, but even in cases where animals have been deprived of food for a considerable period of time."

2. "That the blood of the right side of the heart contains from a quarter to half a grain of glucose per fluidounce, under strictly physiological conditions."

3. "That the quantity of glucose in the right side of the heart is from two to four times greater than that found under corresponding circumstances in the jugular vein."

4. "That this excess argues a by no means insignificant amount of sugar in the pure hepatic blood, before it has become largely diluted with the comparatively non-saccharine fluids of the venæ cavæ."

5. "That we are forced to admit the fact of sugar formation by the liver, though we fail to detect the presence of sugar in the liver-tissue, when after death the fermentation of the glycogenic matter is prevented."

It seems proved, by the experiments of the physiologists above cited, that the liver possesses the property of producing

sugar; but the facts they have presented will not warrant us in forming a theorem to the effect that the liver is necessarily or at least primarily the offending viscus in diabetes. Cases of the malady occur in which we can detect no peculiar lesion in the hepatic tissue. An increased normal function of a gland, however, may not be accompanied by serious organic changes; but the result of such hyperaction may prove otherwise disastrous.

Had we no other facts to guide us than those before given, we might infer that the liver was the chief seat of mischief in polyuria, and perhaps at least take a step in advance of those writers, who have placed the malady among the renal disorders. Indeed, as we may have occasion hereafter to show, the liver in many cases may be the substantial cause of diabetes, while in others it may not be the most essential one.

To the other physiological phenomena to which reference has been made as throwing light upon our subject, allusion will now be made. Bernard, in 1855, called special attention to the influence of the nervous system upon the renal secretion. He found, as given by Dr. Flint, Jr., "that when irritation was applied to the floor of the fourth ventricle, in the median line, exactly in the middle of the space comprised between the origin of the pneumogastrics and the auditory nerves, the urine was increased in quantity, and became strongly saccharine. When the irritation was applied a little above this point, the urine was simply increased in quantity, but contained no sugar; and when the puncture was made a little below, sugar appeared in the urine without any increase in the quantity of the secretion." These facts serve to explain many of the phenomena observed in diabetes.

It is very evident that irritation applied to several parts within the cranial cavity has an influence upon glycogenesis and upon various secretions and excretions. How many instances might also be cited to illustrate somewhat similar phenomena from *reflex* action! By exciting the salivary secretion, the flow of the gastric juice can be augmented. Bernard and Pavy have shown that the inhalation of anæsthetics and various other gases will be followed by melituria, and attribute such result to the irritation conveyed to the encephalon by the

pneumogastric, and thence reflected. Artificial diabetes can therefore be induced by the irritation of certain nerves at their *terminal* ramifications, as well as at or near their points of *origin* within the cranium.

Clinical observation of diabetes confirms the views of experimental physiologists in relation to the etiology of the malady. And here allow me to digress for a moment from my subject, in order, while referring to reflex influences upon secretion, to suggest a new theory, viz., a possible *increase of hepatic glycogenesis under certain normal conditions.*

Sugar is not ordinarily an ingredient of the blood in quantities sufficient to be mentioned in the analyses generally given of that fluid in works on physiology, and again this proximate principle does not normally occur in the permanent secretions and excretions. Milk, however, contains a large amount of this material, according to Robin thirty-seven parts in one thousand, and according to Pareira and Lehmann forty-seven in one thousand, all these authorities agreeing that it is present in the largest proportion of any of its organic constituents.

Now, is all this saccharine matter the result of the elaboration of the mammary glands? Physiologists contend that milk, with the exception of its water and other inorganic principles, is the direct result of the action of the secreting tissues of the breasts. As sugar of milk differs in character from ordinary sugar, a learned physiologist has argued that it is prepared *de novo* and is not dependent on the qantity of saccharine matter in the blood, as is also shown by *artificially* introducing sugar into the blood-vessels of a living animal—under which circumstances the saccharine matter is eliminated by the kidneys. It is admitted, however, that "caseine is produced in the mammary glands probably by a catalytic transformation of the albuminoid constituents of the blood." As this quaternary *protein* principle is necessarily elaborated from the nitrogenous ingredients of the blood, and must be abundant or deficient in the milk, as the latter abound or are deficient in the circulating fluid, it would appear probable that the *lactose* should likewise vary in quantity corresponding with the greater or less amounts of analogous *ternary* proximate principles in the blood.

It seems to me that the peculiar condition of the breasts toward the close of utero-gestation, and especially during lactation, can excite the liver to increased glycogenesis by a reflex nervous influence, and the *animal* sugar thus *naturally* thrown into the circulation, and which under morbid circumstances would be mainly eliminated by the kidneys, as in diabetes, is in this instance chiefly appropriated by the mammæ and made to subserve the important work of aiding in the nutrition of the nursing infant. To sustain this theory, Dr. Smith gave an analysis which had been made for him of the blood of a healthy nursing-woman, drawn for the purpose. The blood yielded sugar. No saccharine matter was present in the urine.

Uterine irritation, especially during gestation, may also excite augmented hepatic sugar generation by a reflex influence—as an example of such action I would cite a case of diabetes occurring in a woman. Pregnancy seemed to increase the gravity of the disorder, and to induce a fatal termination.

In another instance (the young wife of a physician), the patient died of melituria a few months after marriage, the diabetes appearing to date from the time of conception.

Simon, several years ago, observed that milk was richer in sugar during the earlier months of lactation than at later periods. This phenomenon may now, perhaps, thus be explained: The breasts when beginning to assume activity are in a condition to induce a general disturbance of the system, and more apt to excite increased hepatic sugar formation by a reflex influence. When fully developed they temporarily, to a certain extent, occupy the position of glandular organs whose functions are permanent, and consequently their tendency to excite any special or general erethism is diminished.

(At a subsequent meeting, Dr. Smith stated that he had since met with an additional reason for supposing that during pregnancy and lactation there was an increased glucæmia, for Fardel states that M. Blot has frequently noted a temporary glycosuria during utero-gestation, and among nursing-women. M. Blot, so far as Dr. Smith is aware, has not attributed such phenomenon to the peculiar reflex influence above described, or at least not assigned any use for the glucæmia. The production of sugar under the circumstances des-

ignated, appears from this statement to be so liberal that a part of the sugar is often eliminated as in diabetes.)

Artificial injuries of different parts of the brain, quite adjacent, have different effects, as has been shown, upon the renal secretion. These effects are characterized—1. By an excessive diuresis; 2. By an excessive flow of water containing saccharine matter; and 3. By the urine being normal in quantity, but loaded with sugar. All these phenomena have their analogues in idiopathic diseased conditions, the first of them corresponding with diabetes insipidus, the second with the ordinary form of diabetes, and the third with cases more occasionally presenting themselves.

After citing a case in which a *post-mortem* examination revealed disease of the fourth ventricle of the brain, and alluding to other cases in which the lesions were entirely peripheral, Dr. Smith continues:

As we do not recognize any constant hepatic lesion in melituria, as we do recognize cerebral alterations in some cases, and are aware of instances of sugar formation by a reflex influence, the following definition and classification of diabetes is suggested:

Diabetes mellitus, a disease of the nervous system, depending either upon *centric* or upon *eccentric* disturbance; by centric implying cerebral lesion, by eccentric referring to peripheral irritation transmitted to the brain, and reflected either to the liver or other parts, inducing the formation of sugar, and likewise, generally, reflected to the kidneys, exciting excessive diuresis.

Diabetis insipidus, a disease of the nervous system, depending either upon *centric* or upon *eccentric* disturbance; in this malady the morbid influence, whether reflected or otherwise, being chiefly directed to the kidneys.

Subsequent statements will distinctly show that such definition is not meant to include every case presenting the symptoms of glycosuria. Albuminuria does not necessarily indicate organic disease of the kidneys. The etiology of an important group of cases, however, may be thus satisfactorily explained:

Some such classification of the malady will enable us to distinguish the milder from the graver cases; the curable from

the incurable; and qualify us to address our remedies to the removal of the causes of the disorder, and thus not fruitlessly waste exertions in temporarily dispelling some prominent symptom.

As illustrative of this point, it may be stated that Dr. Robert T. Edes, in his prize essay on the "Physiology and Pathology of the Sympathetic or Ganglionic Nervous System," informs us that "Dr. Goolden has admitted every case of epilepsy, paralysis, and chorea, that has applied at his hospital (St. Thomas's, London), during his week of admission, and not only has he found sugar in a large number of cases, but he has found the sugar to disappear as the symptoms were relieved by treatment."

Can we not, in many cases of diabetes not thus induced, be equally successful in management, if we more closely study their etiology and pathology? In our present state of knowledge it is not always possible to precisely fix the original point of irritation. The liver may, in some instances, be primarily the offending viscus; even impaired function in this organ may disturb the cerebrum, which in turn by a reflex action may augment the hepatic derangement.

I would not confine the primary irritation to the liver only. Glycosuria may follow paroxysms of pertussis and asthma. Where, indeed, can we stop in searching for the initial point of departure from health? The lungs, stomach, bowels, kidneys, skin, and various other parts of the body, are so intimately interlinked and so mysteriously connected with the great nervous centre, that irritation in any of them may occasionally be instrumental in inducing the peculiar reflex action to which I have alluded. The diabetes becomes permanent, for the reason that we have failed to detect and remove its cause. In many of these cases, however, the cause is doubtless irremovable, even though recognized.

There is doubtless a group of cases of glycosuria, dependent chiefly upon an error of diet, as e. g., an ingestion of too bountiful a supply of either of saccharine or of amylaceous materials. Such cases, however, are not those of confirmed diabetes, but, since they can be entirely relieved by a *chemical* adjustment of the pabulum, and as permanent melituria can be palliated

by similar means, it has been contended that the disease is entirely attributable to some defect of vital chemistry.

Such a view of the pathology of the malady is scarcely consistent with the apparently well-established facts which show a relationship between glycosuria and nervous irritation. Nervous excitement will occasionally abruptly change the *chemical* composition of the milk yielded by the nursing mother and render the secretion unsuitable for food. Similar disturbance may either arrest the elaboration or modify the character of the gastric juice; while an analogous influence operating upon the kidneys may induce an elimination differing very essentially from normal urine.

It is thus seen that nervous influences can disturb the operations of vital chemistry, and while the converse of this is also true, nevertheless a weight of testimony indicates that, in diabetes, the nervous element of causation has priority in the majority of the confirmed cases of the disease.

The fact is now distinctly recognized that many cases of melituria are remediable. When the malady is dependent upon an organic centric lesion, or upon an organic peripheric change exciting sugar formation by a reflex action, the disorder may prove incurable; when, however, the disease is referable simply to a centric or peripheric irritation, the cause of irritation may be removed and the patient relieved of the glycosuria.

We have seen that temporary or artificial diabetes may follow other conditions besides injuries to the nervous system and a subsistence on hyper-amylaceous diet.

Pavy states that melituria has "been induced by impeding respiration; by poisoning with woorari and strychnia; by thrusting needles into the liver (Schiff); by chloroform inhalations in warm-blooded animals; in frogs, by tying the afferent veins of the kidneys so as to increase the flow of blood through the liver (Schiff); by injecting acids into the veins."

As impeded or imperfect respiration favors a glucæmic condition, the following thought is suggested: a considerable number of patients with diabetes perish from phthisis, or from what is vaguely termed asthenia, which may include chronic

pulmonary disease. In some such cases is not the diabetes induced by the reflex irritation of the tuberculosis, even in its early stage? Before attention has been specially directed to the lungs, the melituria may have attracted notice. The hectic fever, finally developed, does not entirely arrest the glycogenesis for the reason that during parts of the day the patients are comparatively exempt from it. The accepted view on this subject is to the effect that phthisis is a malady ordinarily intercurrent to diabetes. While not denying this to be a fact, it may be added as a corollary to what has been before said, that phthisis may be antecedent to and the exciting cause of diabetes.

Interruption to the healthy performance of respiration occasionally induces glucæmia and glycosuria; is not a disturbance of the cutaneous function followed at times by the same sequelæ? The concurrence of diabetes and furuncles, carbuncles and gangrenous conditions, has been repeatedly noted. Does the same morbid condition which begets these phlegmons also engender melituria? Such may be the case, but the coincidence may possibly otherwise be explained.

The blood ordinarily loses most of its sugar in passing through the lungs, and the quantity normally remaining, if not otherwise appropriated, may be eliminated through the skin as water and carbonic acid. If the cutaneous function is disturbed, such elimination may be prevented and melituria occur as a sequel of such accumulation of saccharine material, in the circulation. It may be found that in quite a number of diseases of the skin there may be an accompanying polyuria. Transient melituria, indeed, may be of as common occurrence as ephemeral albuminuria; neither the one nor the other being indicative of organic disease.

As preliminary to a further exposition of the subject, it is proper to remark that some physiologists contend that sugar may be formed by other structures than those of the liver, for it is stated that a glycogenic principle can be detected in the muscles and lungs of the fœtus, in the muscles of hybernating animals, and in "limbs paralyzed by division of the motor nerves." While not advancing the opinion that the liver is the only sugar-house of the animal economy, it must be ap-

parent, from what has been said, that the phenomena just cited can be satisfactorily explained without seeking further information than we now possess concerning glycogenesis.

It now becomes necessary to attempt to illustrate practically what has been said preliminarily, and to a certain extent theoretically, and in doing so I shall briefly analyze the histories of twenty-six cases of diabetes. Several of these cases have been under my immediate care in private practice, the majority of them have occurred in the New York Hospital, and their histories have been obtained from clinical records, some having been under my charge, others under that of my colleagues or predecessors in the Infirmary. (See table, pp. 562, 563.)

The average age of the patients was thirty-seven years, the youngest twenty-two years, the oldest seventy-five years—both of these were somewhat relieved by treatment. All were males. As respects the nativities, eighteen were born in the United States; three in Ireland; two in England; one in Scotland ; not stated, two.

Regarding the occupations, there were : sailors, six; laborers and carpenters, each two; and shoemaker, coach-maker, teacher, moulder, hatter, lawyer, stoker, railroad master, drover, manufacturer, merchant, physician, and agriculturist, of each one; not stated, three.

Of the *duration* of the disease, prior to these cases coming under annotation: in twenty cases the average length of time was about one year and eight months; in four instances the patients were unaware of the precise period they had suffered with the disease; in one case the diabetes manifested itself while the patient was under treatment for chronic diarrhœa, and in one instance the malady was detected on the patient applying for relief from other difficulties. In the twenty cases above cited, the shortest period was three weeks, and the longest between six and seven years.

The result of these twenty-six cases was as follows: relieved, fifteen; several of these are recorded as cured; died, seven; remaining *in statu quo*, four.

Of those only partially relieved, it is safe to assert that several of them were rendered so comfortable that they had

Table of Twenty-six Cases of Diabetes Mellitus.

Number of Case.	Age.	Occupation.	Nativity.	Partial History and Possible Cause.	Duration before coming under Observation.	Result.	Remarks.
1	22	Seaman	Mass.	Eight months before had an attack of acute nephritis.	Recognized when placed under treatment.	Improved	Urine both albuminous and saccharine.
2	23	Stoker	Ohio	Healthy until three months before, when he had an attack of pneumonia.	Three months	Died	Gradual exhaustion.
3	24	Seaman	United States.	Three weeks before admission, complained of great exhaustion and excessive diuresis.	Three weeks	*In statu quo*	Left shortly after coming under treatment.
4	25	Drover	New Jersey	Nine weeks before, suffered with dyspnœa and dyspepsia. Intemperate for the last year.	Four weeks	Relieved.	
5	28	Coachmaker	New Jersey	Developed suddenly during an attack of partial hemiplegia.	Nine months	Relieved	Urine reduced in quant. to 4½ pints and contained little sugar. Gained in weight 15 lbs. in two months.
6	28	Carpenter		Two years before had ascites, recovered. Subsequently, general dropsy. Chronic Diarrhœa.		Died	At time of death had jaundice. Urine suppressed. Died comatose.
7	29	Seaman	New York	Came on suddenly with pain over kidneys and feebleness of gait.	Three months and a half.	*In statu quo*	Eloped from hospital. Died about a week subsequently.
8	29	Carpenter	Mass.	Four years before, had typhoid pneumonia, which confined him to the house eleven weeks. While convalescing, diabetes showed up.	Four years	Somewhat relieved.	Had cataract. Phthisis developing.
9	30		New York	Has always suffered with micturition. Twelve years ago, had pneumonia.	One year	Died	Died comatose. Bright's disease.
10	31	Shoemaker	Mass.	Addicted to the excessive use of tobacco.	One year	Improved.	
11	32	Laborer	Ireland	Lumbago		Relieved	Recorded as cured.
12	32	Seaman	New York	Intemperate habits. Has had jaundice.	Six months	Relieved	Recorded as cured.
13	35		England	Mental anxiety concerning business. Has phthisis, with cavity in left lung.	One year	*In statu quo.*	
14	36	Seaman	Pennsylvania.	One year ago, had remittent fever, followed by diarrhœa, which has continued most of the time since.	One month	Died	Gradual exhaustion.
15	37	Hatter	New York	Has suffered five months with diarrhœa contracted in Mexico.	While under treatment.	Relieved	Under treatment 4½ months. Gained 30 lbs.

16..	38..	....	....	States that he took cold two years and a half ago, and that excessive diuresis commenced that night.	Two years and six months.	Relieved.	
17..	39..	R. R. Master......	England......	Has enjoyed good health until attacked with int. fever. About seven months ago, after a severe day's ride on horse back, became very stiff, and micturition commenced shortly after.	Seven months......	*In statu quo*.......	Phthsis developed.
18..	40..	Laborer...	Ireland	Manifest during apparent health........	Three years........	Relieved	Urine albuminous and saccharine.
19.	44..	Moulder..........	Ireland.......	While convalescing from remittent fever, attacked with lumbago and diuresis.	Eight months......	Relieved	Recorded as cured on register of hospital.
20..	45..	Seaman	Scotland......	Came on suddenly while in apparent good health.	One year...........	Died..............	Phthisis.
21..	47..	Manufacturer	Mass.........	Dyspeptic for 2 or 3 years. Subject to bronchitis. Has been very amorous since boyhood.	Recognized when under treatment for debility.	Cured.	
22..	55..	Physician	United States.	Active mental work. Has suffered for many years from ch. diarrhœa.	Several years	Died........... ..	Comatose.
23..	58..	Agriculturist.....	Connecticut..	Brother of last case. In early life intemperate. Dyspeptic. Has numbness of head and cramp in one limb.	One year...........	Improved.	
24..	65..	Teacher..........	Mass.........	Followed a slight attack of hemiplegia. Had previously taught 12 hours a day for 10 years. Habits, sedentary.	Five years..........	Improved.........	Relief afforded by diet, alkalies, and removal to the country.
25..	66..	Merchant.........	New York ...	Mental tension in business.............	Five years..........	Died	Gangrene of foot.
26..	75..	Lawyer	New York ...	Habits regular, and the disease manifested while in apparent health.	Six or seven years.	Relieved.	

simply to conform to the old law laid down about the year 1097, in the "Code of Health of the School of Salernum," as translated by our distinguished Fellow, Dr. John Ordronaux, viz.:

> "At least six times in every fleeting day,
> Some tribute to the renal function pay."

The means of relief resorted to in the management of these patients have varied, but have been chiefly: meat diet, bran cakes (Camplin), baths, opium, bark, preparations of iron, creosote, cod-liver oil, benzoic acid, alkaline salts, mineral waters, aloes, nux-vomica, rest from mental labor, travelling, etc.

The data herewith presented are valuable in several particulars, but are not sufficiently extended to show that either age, sex, or occupation, predisposes to the disease. In a subsequent table these points will be illustrated in a more extended and satisfactory manner.

In relation to the hereditary transmissibility of diabetes, comparatively few observations have been made. Fardel, Bouchardat, Blumenbach, Isenflamm, Prout, Pavy, Alquié, Mosler, and others, have reported instances in which the disorder has descended from parent to offspring. The latter gentleman was consulted by a peasant, aged forty-seven years, suffering with the disease, whose parents had both had the malady; and in the course of three months her own son, aged fifteen years, fell a victim to the complaint.

The only fact enumerated in the table which has a bearing upon this point relates to Cases XXII. and XXIII. respectively. The patients were brothers, one a medical man of New England; their cases were described at length by Dr. Smith.

They do not appear to have derived from their parents any tendency to it; possibly the predisposition descended from an antecedent generation, as may occur with transmitted diathesis.

In examining the causes to which the diabetes was attributed in the cases which have been tabulated, it is noteworthy that there is scarcely one of them which can be regarded as an essential one. Large numbers of persons are constantly exposed to the same conditions without having polyuria as a sequel, and we learn the important fact that diverse irri-

tations may induce the disorder. If the malady was always dependent upon centric lesions, such as were found in the five cases carefully described by Dr. William H. Dickinson of London (*Lancet*, February 19, 1870), I feel confident that such alterations in the nervous structure would be manifested by other phenomena than are usually observed in melituria. Any observations of this medical investigator must receive the highest consideration. The lesions which he has found, and which he has so minutely described, indicate that their delineator poseesses powers of observation especially fitted for pathological research. The lesions in question are, doubtless, in a number of instances of primary occurrence, while in others they may be of secondary incidence; but whether they are regarded as *prodromata* or *sequelæ*, they are scarcely observed in a proportion of cases sufficiently large to be regarded as *pathognomonic* of diabetes.

The urine voided by diabetic patients, as is well known, is generally of high specific gravity, and is large in quantity. In one instance, the invalid, who was also suffering from chronic diarrhœa, passed at most but six pints, and its specific gravity varied from 1,005 to 1,009. It was tested on several occasions; "sugar was detected in the first three trials, by the fourth a substance resembling gum." That there was no mistake in the analysis may be inferred from the fact that the examination was made by Prof. Reid. This patient gradually failed, and died twenty days after his admission to the hospital. Three autopsies of adults were here cited, as made in the New York Hospital. The lesions found were peripheral.

As diabetes is a rare affection in children, it may be interesting to insert at this time on account of a *post mortem* of an infant under two years of age, who had died of the malady. The case is reported by Dr. James L. Brown, in the *American Journal of Obstetrics*, May, 1868, and is a case to which allusion will again be made in a subsequent table. Dr. Brown says: "A *post-mortem* examination of the body was made by Dr. Jacobi, who saw the child about two weeks before her death. He found the brain large and well developed, having numerous and deep convolutions. That part of the arachnoid covering the anterior two-thirds of the hemispheres was not perfectly

transparent, and there was considerable injection of the dura mater, and in fact of nearly the whole encephalon. There was some thickening of the arachnoid in the fissure of Sylvius, and a few granulations having the appearance of very recent miliary tubercles. The ventricles contained very little fluid and were entirely normal. The choroid plexus contained hundreds of miliary tubercles. On first inspection the lungs presented nothing abnormal, but a closer examination discovered a number of little dots, just visible, which were evidently newly-formed tubercles. The spleen was found studded with miliary tubercles, their number and development being much greater here than in any other part of the body. Nothing abnormal was found in the liver or kidneys, except that the right kidney was somewhat larger than the left, and that the cortical substance of the left was more congested than that of the right. These were the only lesions found, and being all of recent origin and obviously secondary to the diabetes, the results of the autopsy, so far as the primary disease was concerned, were entirely negative."

It appears to me that these autopsies confirm the views which have been here expressed in relation to the pathology of diabetes.

Before proceeding to another division of our subject, attention is invited for a few moments to the disorder known as diabetes insipidus. A table is herewith presented of four cases of the malady occurring in the New York Hospital. (See p. 567.)

In scanning the causes assigned for the malady, it is noteworthy how allied they are in character to those given for diabetes mellitus. As all the cases were relieved by treatment and did not manifest any evidences of cerebral disease, it would appear that the disorder did not depend upon any organic cerebral lesion, although it occasionally may be due to such condition.

It will be borne in mind that Bernard has shown that irritation of certain parts of the brain will induce excessive diuresis, but not melituria. If this be a fact, it is presumable, from what has been shown, that diabetes insipidus may be due either, first, to centric irritation, or second, to peripheric

Diabetes Insipidus.

No. of Case.	Age	Occupation.	Nativity.	Cause assigned.	Duration before Admission.	Result.	Time under Treatment.
1	21	Factory girl.	New York..	Exposure while thinly clad to inclement weather.	About one year.	Relieved.	2 months and a half
2	29	Steward.....	New York..	In August had dysentery. In Sept., after exposure to wet, attacked with Diarrhœa and with Diuresis.	One month.	Relieved.	2 months and 10 days.
3	36	Servant......	France.....	While under treatment for Hepatitis, seized with excessive Diuresis.	While under treatment.	Cured....	2 months and 16 days.
4	38	Seaman......	Scotland....	Has had Diarrhœa for four months, and also suffered with Int. Fever.	While under treatment.	Cured....	3 months and 20 days.

irritation transmitted to the brain. In the latter case a morbid influence is reflected to the kidneys as chiefly manifested by hyper-secretion.

If we can relieve such cases, are we not warranted in the hope that in melituria, not dependent on an organic lesion, we can detect the points of irritation either centric or peripheric, and, by addressing our remedies to such points, subdue the irritation and the general disturbances to which it has given rise?

To the subject of the more immediate causes of death in diabetes, attention is now invited. In determining these I have not thought proper to rely on the limited experience of a few solitary observers, but have had recourse to the records of the Metropolitan Board of Health of this city for a period extending over three years and three months. It will be remembered that in death-certificates both the primary and secondary causes of decease are required. As the deaths are reported they are systematically entered, but not classified, though a general classification is made at the close of the year. To procure both causes has incurred the necessity of inspecting the individual entries of 80,016 deaths. For aid rendered in this examination I would express indebtedness to Dr. Elisha Harris, Sanitary Superintendent; to his successor, Dr. Moreau

Morris; to Mr. John Bowne, Register Clerk of the Board; and to my pupil, Mr. William Oliver Moore.

Out of this large number of deaths, viz., 80,016, but 58 were recorded from diabetes, either as a proximate or remote cause, or, as it may otherwise be stated, but one death in every 1,379. As an additional interesting fact, it may be stated that the 58 deaths were reported by 58 different physicians; in not a single instance during the time specified has a medical man reported a second case of death from the disease in question.

As illustrating the rarity of the disorder the deaths of each year may be thus be tabulated:

Year.	Deaths from Diabetes.	Ratio of Deaths from Diabetes to Total Deaths.	Ratio of Deaths from Diabetes to the Population.
1867	17	1 to 1,379	1 to 58,823
1868	10	1 to 2,488	1 to 100,000
1869	22	1 to 1,143	1 to 45,454
1870 (3 months.)	9	1 to 724	1 to 14,111

Can the inaptitude of our citizens to the malady be traced to favorable meteorological influences? Our climate favors the development of Bright's disease—is it inimical to melituria? Few reliable data have been gathered in relation to the relative frequency of the disorder in different parts of the world. Fardel states that it is of common occurrence in France, in England, in Northern and Southern Europe, in the Scandinavian territory, in Russia, Spain, Italy, and the French colonies. It appears to be on the increase in France, but Fardel suggests that the disease may be more generally recognized at the present day than heretofore.

The disorder prevails both in tropical and in arctic regions. Of its relative frequency, however, among the inhabitants of these widely-separated regions and of intermediate localities, we are still in ignorance. Torrid heat, polar cold, and subtile atmospherical conditions, may not directly induce, but may *indirectly* provoke the disorder. Facts relating to these points have yet to be gathered, and we have yet to learn whether diabetes has its chosen *habitats* or whether it smites indiscriminately and alike the people of every nation.

Table of Deaths from Diabetes Mellitus in New York City for Three Years and Three Months.

No. of Case.	Deaths in each Decade.	Age. Years.	M'ths.	Days.	Sex.	Condition.	Occupation.	Nativity.	Cause of Death.	Complicating or Secondary Cause of Death.	Duration of the Diabetes.
1	Und'r 10, 2	1	11	..	F..	....	....	N. Y..	Diabetes	Exhaustion........	10 weeks
2	cases.	9	1	13	F..	....	....	N. Y..	"	Exhaustion........	3 weeks
3	———	10	..	3	M..	....	....	N. Y..	"	Asthenia...........	3 months
4	10 to	11	2	7	M..	....	....	N. Y..	"	....	14 days
5	20, 3	16	7	16	F..	....	....	N. Y..	"	Uræmia...........	2 years
6	cases.	23	..	..	..	....	....	Scot..	"	Exhaustion........	....
7	———	23	..	..	F..	Single.....	Milliner.......	Ire....	"	Exhaustion........	8 months
8		26	10	5	F..	Married...	....	N. Y..	"	....	3 months
9	20 to	28	6	8	F..	Married...	....	N. Y..	"	Nervous exhaustion	5 months
10	30, 8	28	11	16	F..	Married...	....	N. Y..	"	Pregnancy........	18 months
11	cases.	29	..	..	M..	Married...	Cook.........	N. J.. col'd.	"	Uræmia...........	4 weeks
12		29	..	..	M..	Married...	Clerk.........	N. Y..	"	....	6 months
13	———	29	7	4	M..	Married...	Carman.......	N. Y..	"	....	2 months
14		30	..	..	M..	Single.....	Seaman.......	N. Y..	"	Uræmia...........	1 year
15		30	..	..	F..	Married...	Cook.........	Virg.. col'd.	"	Asthenia...........	7 months
16		32	..	..	F..	Married...	....	Penn.	"	....	8 months
17		32	..	..	M..	Married...	Book-binder..	Ger...	"	....	Sevl. yrs.
18	30 to	32	..	22	F..	Widow...	....	N. Y..	"	Inanition..........	3 years
19	40, 11	32	5	23	F..	Single.....	....	N. Y..	"	Effusion of brain...	....
20	cases.	34	..	..		Married...	....	Ire....	"	....	3 months
21		35	..	..	M..	....	....	Eng..	"	....	....
22		35	..	..	M..	Married...	Minister......	Russ.	"	Œdema cerebri....	6 months
23		36	..	..	M..	Married...	Store-keeper..	Eng..	"	Acute phthisis.....	7 months
24		36	2	..	M..	Married...	....	Ger....	"	Exhaustion........	2 years
25	———	40	..	..	M..	Single.....	Clerk.........	Ire....	"	Dropsy............	1 year
26		40	6	..	F..	Married...	....	Ire....	"	Exhaustion........	1 yr. 11m
27		42	..	..	M..	Single.....	Clerk.........	N. Y..	"	Bright's Disease...	2 yrs 6 m
28		45	..	11	F..	Widow....	Housekeeper.	N. Y..	"	Pneumonia........	2 years
29	40 to	47	..	21	M..	Widower.	Banker........	N. J..	"	Bright's Disease...	6 years
30	50, 10 cases.	47	6	..	M..	Married.	Ex. U. S. Pat. Officer.	N. Y..	"	....	6 months
31		47	6	..	M..	Married...	Broker........	Penn.	"	Carbuncles.........	2 years
32		48	..	..	M..	Married...	Watchman.....	Ire...	"	Pneumonia........	....
33		48	..	..	M..	Married...	Laborer.......	Ger...	"	Bright's Disease...	3 months
34	———	48	6	21	M..	Married...	Hotel-keeper.	Ger...		Gangrene left foot. Disease 4th ventricle............	3 years
35		50	..	..	F..	Widow....		Can...	"	....	2 years
36		50	..	..	M..	....	Physician....	Eng..	"	Exhaustion from sea-sickness.	...
37	50 to 60, 9	52	..	..	M..	Married...	Tailor.........	Ire...	"	....	6 months
38	cases.	54	..	..	F..	Single......	Teacher.......	N. Y.. col'd.	"	Exhaustion and, finally, suppression of urine.	1 year
39		54	..	..	F..	Married...	Housekeeper.	N. H..	"	Exhaustion........	1 yr 6 m
40		56	..	..	M..	Single.....	....	N. Y..	"	Paralysis...........	2 or 3 yrs
41		57	..	..	M..	Married...	Merchant.....	Eng..	"	Meningitis.........	3 years
42	———	57	..	..	M..	Married...	Nurse........	Ire...	"	....	10 months
43		59	7	2	M..	....	....	N. Y..	"	....	....
44		60	2	22	F..	Married...	Housekeeper.	N. J..	"	....	11 years
45		61	4	10	M.	Single......	....	N. Y..	"	Severe chill........	2 years
46	60 to	62	8	..	F..	Married...	....	Switz	"	Asthenia...........	2 years
47	70, 9	63	..	..	M..	Married...	Cutter........	Ger..	"	Phthisis Pulmonalis	....
48	cases.	65	..	..	M...	Widower.	Carman.....	N. Y..	"	Retention of urine..	1 month
49		66	..	..	M..	Married...	....	Fran..	"	Asthenia...........	Sev'l yrs
50		66	5	29	M..	Married...	Merchant.....	N. Y..	"	Gangrene of lft. foot	5 years
51	———	68	..	..	F..	Widow....	....	Eng..	"	Bright's Disease...	Sev'l yrs
52	70 to	69	..	..	M..	Married...	Merchant.....	Conn.	"	Bright's Disease...	2 years
53	80, 4	70	10	17	F..	Widow....	....	N. Y..	"	Old age............	1 year
54	cases.	75	..	..	F...	Widow....	....	N. J.	"	....	2 years
55	———	76	4	..	F....	Widow....	Housekeeper.	Mass.	"	....	6 months
56	80 to	79	..	1	M..	Widower.	Merchant.....	N. J.	"	....	1 year
57	90, 2	83	2	16	F...	Widow....	....	N. H.	"	Uræmia...........	6 months
58	cases.	85	5	22	M..	Widower.	Carpenter....	Penn.	"	Old age............	2 years

In the subjoined table the data have been substantially copied *verbatim* from the official records, and compared with the original death-certificate.

In viewing this table it is noteworthy that neither extreme of life is exempt from melituria. The youngest victim had attained an age of but one year and eleven months, while the oldest had reached the ripe period of eighty-five years, five months, and twenty-two days.

The mortality during the several decades of life from twenty to seventy has not varied to any marked extent, but its acme occurred between thirty and forty.

In reference to the disease in early life, Prout, West, and Bouchut, speak of its extreme rarity at that period. Hanner has given one case of it in an infant of twelve months. Bird, in his translation of Bouchut, notes the fact that Prout, out of a total of 700 cases of diabetes, had met with "but one instance of it in a child five years old, and only twelve in young persons between the ages of eight and twenty."

There seems to be no valid reason why the disease should not prevail during early childhood. It has been already stated that a glycogenic principle can be found in the tissues of the fœtus, but that ordinarily it cannot be detected after the birth of the child. Is it not probable that the malady is occasionally overlooked? In the young infant excessive diuresis may escape the attention of the nurse, and, if it attract notice, the difficulty in procuring a sufficient quantity of the urine for examination may preclude the recognition of melituria. In the mean time the child is gradually dehydrated, its tissues emaciated, its food undigested, and its death may be attributed to some species of marasmus, as atrophia infantilis, tabes mesenterica, etc., unless some intercurrent acute malady has proved the immediate cause of dissolution.

I would invite special attention to this point, not believing that the disease is of very common occurrence during infancy, but that it may more frequently induce death than we are generally aware. In this city, during the year 1869, more than half the deaths, viz.: 12,859, were of children under five years of age, and of this number 10,311 had not completed their second year. About 500 of these last are recorded under

the headings of inanition, debility, and atrophy. As the disorder in question is more liable to be overlooked at this tender period of life than at others, is it not possible that more deaths occur from diabetes among children than appear by the records?

From these statistics and those before given, relating to diabetes as it appears among our own citizens, can be derived many interesting facts appertaining to its etiology, pathology, cause, duration, and termination. The latter table exhibits the disorders liable to become intercurrent, and to hasten an unfavorable issue, and we are thus warned to shield our patients, so far as it is possible, from their invasion.

A final subject which remains for consideration is the management of the disorder. It is manifestly impracticable at this late hour to speak of all the remedies which have either been employed or suggested in the treatment of the malady, and my remarks must chiefly be confined to the philosophical principles which apparently direct a correct plan of therapeusis.

If it is found that the melituria is dependent upon an organic centric lesion, or upon an organic peripheric lesion, we must usually deplore the fact that we are incompetent to avert a fatal termination of the case. At the same time it may be possible to palliate many unfavorable symptoms, and for a season to prolong the life of the patient. If not caused by intercranial or distal lesion, the cerebral irritation or peripheric sources of disturbance may be relieved by treatment. If the irritation is cerebral, spinal, pulmonary, hepatic, intestinal, cutaneous, nephritic, etc., modify and relieve such cause, and remove the diabetic sequel. If syphilis and other dyscrasiæ are exerting their morbid influences, our remedies are to be addressed to such diseased habits.

The alkaline waters of certain German spas have an enviable reputation in the cure of the disease, but they are by no means specifics. Alkalies appear to possess either a retarding influence upon sugar formation, or the power to cause indirectly the destruction of sugar in the animal economy: it is probable, however, that, in addition to any medicinal effect of the mineral waters, the surrounding favorable hygienic in

fluences recuperate diabetic patients in the same manner that they restore ordinary valetudinarians.

In one of the cases coming under my care the patient was very much relieved while availing himself of the hygienic and therapeutical advantages afforded by the German watering-places; but on returning to this country it was found that his disease had not been eradicated. He died a few months subsequently from exhaustion, specially induced by gangrene of the foot; the gangrene having been excited by a slight and accidental puncture of the great-toe.—(*Vide* N. Y. MEDICAL JOURNAL, July, 1870, pp. 566, 567.) A species of senile gangrene of the extremities, however, is one of the terminations of diabetes, irrespective of any traumatic cause.

As alkaline preparations are by no means specifics, several questions of interest arise in this connection: in the first place, to what cases are they suited? and in the second place, in what manner do they prove remedial?

If the disease is manifestly due to organic lesions, either centric or peripheric, we can scarcely expect to effect a radical cure by the medicinal agents referred to. Nature, however, is occasionally tolerant of organic changes in important viscera; this phenomenon is particularly noticeable in the disorder which may be denominated the latent form of Bright's disease.

So, also, when there are other structural changes, while the tissues may not be restored to their normal condition, Nature can, to a certain extent, accommodate herself to the abnormal condition if the patient is placed under otherwise favorable circumstances. It is in certain of the cases of diabetes dependent upon centric or peripheric irritation that we may hope for a permanent cure from the remedies in question; in others such means can only palliate.

It is difficult to determine in what manner the alkalies prove remedial. Do they prevent sugar formation? They have not the property either of oxidizing or otherwise destroying sugar, though they may indirectly cause its transformation by correcting an undue acidity of the blood. They may behave after this manner—mineral waters, applicable to chronic disorders, generally act more efficiently during the warm months

of spring and autumn; in other words, when their action is partially directed to the skin. Under alkaline medication warts may disappear, and various cutaneous disorders be ameliorated. It is well known that carbonic acid and water are eliminated from the cutaneous surface. If mineral waters favor a determination to the skin and favorably affect the capillary circulation, it is presumable that the sugar may be destroyed either in or near the cuticle, and be eliminated as carbonic acid and water, besides otherwise favoring diaphoresis. In health, sugar for the most part disappears from the blood in passing through the lungs; in diabetes, where the patients are placed upon the use of alkalies, the surplus sugar is possibly to a great extent eliminated both directly and indirectly through the skin. This hypothesis is worthy of more extended consideration, and is a *rationale* which future observations may prove to be correct.

The dietetic method of treatment has its disadvantages as well as its advantages. In the desire to preclude the use of sugar and of ternary proximate principles liable to conversion into sugar in the animal economy, there is danger of relying too exclusively on the quaternary or protein bodies, and of inducing thereby a morbid condition tending to the exhaustion and death of the patient. This misfortune may partially be averted by the ingestion of the oils.

It is not a matter of surprise that so large a proportion of patients suffering with diabetes perish from asthenia and from disorders induced by a low condition of the vital powers. There is a natural tendency in the disease to induce general exhaustion, and when to this cause of depression is added another in the deprivation of proper aliment, dissolution must be expected as a necessary sequence. A judicious employment of a dietetic method of treatment is one of the most potent adjuvants in the management of melituria; an injudicious use of it favors a termination which it is our express purpose to avert.

From what has been said it seems evident that while different cases of diabetes can to a certain extent be treated similarly as respects regimen and diet, there are other particulars of management which must be dissimilar, such diver-

sities being essential in order to overcome the cause and pecularities of each individual case.

In conclusion, I would repeat that by close scrutiny and skilful care it is possible to detect and correct various morbid irritations and conditions capable of exciting melituria. Some of these may even appear insignificant, and yet may be the occasion of diabetes by a reflex influence. As diabetes affords few opportunities of studying its nature, it seems essential, in order that we can better understand its peculiarities, to closely scrutinize the phenomena presented by each instance of the disease, and to note them for comparison with others.

It has been contended that medical philosophy, though apparently progressive, often moves in a curvilinear direction, and returns in the course of time to the very point from which it received an impetus from an early investigator. On a recent occasion in this Academy, it was stated by the learned Fellow, who is now our honored President, that though medical philosophy occasionally might revolve in a circle, nevertheless in its returning strides it did not touch the point from which it started, but rose to a higher level like the spiral of a screw, and with each revolution it was nearer the summit.

Cullen, in his nosology of 1785, as I have before stated, placed diabetes in the class *neuroses*, and his followers have transplanted it hither and thither, until at the present day, in the classification adopted by the Royal College of Physicians of London, the malady appears among the *general* diseases, while in our own Board of Health it ranks among the *local* disorders.

To-night I have advocated the *restoration* of diabetes to the class of *nervous* affections, as a large proportion of the confirmed cases of melituria appear traceable to neurotic causes. Such conclusion has not been drawn from the imperfect scientific premises which guided the Scotch nosologist of the last century, but has been derived from the more precise truths of modern physiology and pathology. Should such a view prevail, medical philosophy concerning diabetes will have described a circle, but in a spiral orbit, and will have risen to a more elevated position.

Many points relating to the disorder are still obscure, and

the difficulties besetting their elucidation are of such magnitude that we cannot immediately surmount them. The views, however, now held respecting the disease must always be adverted to in the future, and in seeking to attain the exact truth we must hope that the geometrical curve, starting from Cullen, may be continued, and that in our ascent each circle may be shorter in axis and each cycle nearer the apex of finite knowledge.

Proceedings of Societies.

MEDICAL SOCIETY OF THE COUNTY OF NEW YORK.

Adjourned Meeting, March 20, 1871.

Dr. Abram Jacobi, President, in the chair.

Pending the arrival of the speaker announced, the President called up Dr. Chamberlain, to continue the discussion of the last meeting, and to give his views on the connection of

SCROFULA, SYPHILIS, AND RACHITIS.

Dr. Chamberlain had understood the President and Dr. Peaslee to recommend the dropping of the term *scrofula*, as being of vague import, and tending, perhaps, to prevent minute inquiry into the specific conditions of the cases to which it was applied. While he could not but welcome the attempt to rescue any subject of medical inquiry from vague generalities, still he thought we were not yet prepared to renounce the doctrine of diathesis, and we should find it difficult to get along without this particular notion of a strumous diathesis.

With reference to the special topic indicated by the President, the speaker supposed the connection between scrofula and syphilis was generally understood to be about this: that syphilis which has passed its active stage in the parent is very likely to be productive of what is called the scrofulous diathesis in the child—a condition marked by the "predominance of the non-vital over the vital tissues," i. e., by predominance of the skin, connective tissue, hair, nails, cartilages; and that

these tissues, thus in excess, are prone to nutritive disorder, inflammation, and ulcerative disease. This opinion was an old as well as a very general one. He had himself accepted it on the strength of authority; and he had gathered many facts in the course of his own observation which seemed to support it. He thought he was safe in saying that while he had often failed to find in the children of parents, whom he knew to be or to have been syphilitic, any manifestations of constitutional syphilis, yet he had very often found those manifestations which we class as scrofulous.

As to rachitis, he had repeatedly seen that form of it known as craniotabes in the families of syphilitic parents.

The President: I certainly did not mean, when I spoke of cases where scrofula was the result of local disease, rather than the cause of local disease, to say that the word ought to be done away with. At all events, it is a convenient term, and until we find a better one we may use it. But we should understand, at the same time, that we know of no condition of the blood that is uniformly found in all those cases we call scrofulous.

So far as the connection between scrofula and syphilis is concerned, I think Dr. Chamberlain is perfectly right. We certainly do find, in the families of syphilitic parents, a number of the children, from the oldest to the youngest, syphilitic, and a number of them scrofulous, the tendency to scrofula or to syphilis in the children depending upon the time that has elapsed since the last attack of syphilis in the parent, or upon the return to activity of syphilis that has been for some time latent.

With regard to a connection between scrofula and rachitis, I would like to say a word. Dr. Smith denied it, but I am convinced that he is mistaken, at least in some particulars. We have more than a mere presumption of the connection between syphilis and rachitis. At all events, microscopical proof has been given that many of the bones of the new-born syphilitic exactly resemble rachitical bones. This has been shown of the epiphyses, and more especially of the costal cartilages. There can be no doubt that congenital syphilis and congenital rachitis cannot be distinguished under the microscope, in many

instances, and, so long as that is the case, I believe that we ought to conclude that congenital rachitis may be the result of hereditary syphilis. Coming now to the connection of rachitis with scrofula, we know that rachitis in early life will develop chronic bronchial catarrh, and enlargement at least of the bronchial and tracheal glands. We know that enlargement of these glands is one of the first and principal symptoms of general scrofula. In rachitis this catarrh, lasting say half a year, together with the glandular affection, is due to a stasis of the blood; and this peculiar slow circulation in the rachitical child would lead to general enlargement of the lymphatic glands, and be the first step in the development of scrofula. Thus I think some degree of connection between the two could be proved.

INTUSSUSCEPTION.

Dr. Stephen Rogers read a paper on this affection, narrating a case in his own practice, with comments, and references to the literature of the subject. The chief points in the case were the following:

A healthy boy, seven years old, had, on a Sunday, four diarrhœal dejections, without pain; was treated with paregoric, and on Monday had the same number, also painless, treated same way. On Tuesday, a similar movement at 4 A. M., and again at 6 A. M. At 8 A. M. he went to the breakfast-table quite comfortable, but was hardly seated before a severe attack of colic sent him to bed. With the pain there was great tenesmus, but nothing whatever passed the bowels, until this had continued about an hour, when there came a little mucus tinged with blood. Several similar passages soon followed, the amount of blood increasing. There was as yet no sickness at stomach. At this point Dr. Rogers saw the case, and, thinking it one of dysentery, administered by rectum one-tenth grain sulphate of morphia, directing it repeated hourly, till relief was given. At 1 P. M. he found it had been twice repeated. The boy had continued to pass bloody mucus, though the pain was mitigated; and at the last passage he had vomited. The vomiting was attributed to the morphia. Skin cool; pulse about 70; moderate tenderness over left hypochondrium, where was a tumor about the shape and size of a large hen's egg. This

tumor, at first supposed to be splenic, was later found to change its position and its form during the paroxysms of tormina. Dr. Chamberlain was called in consultation; thought the diagnosis doubtful, and advised continuance of the morphia treatment, till next morning.

Wednesday morning, Dr. Jacobi also was brought in. There had been no important change in symptoms, except that the paroxysms were far less frequent. The diagnosis made was that of intussusception, involving more or less of the large intestine. The treatment decided on was to keep the patient under morphia, sufficiently to control peristaltic action; to distend the intestine by injections either liquid or aëriform; to keep the pelvis raised, by placing the patient on his knees and elbows, or even with his breast on a low pillow, so as to get the aid of gravity in reducing the invagination; and during the application of the injection to knead the abdomen, so as to facilitate the reduction.

The patient being already decidedly under the influence of morphia, it was deemed unnecessary to give more, either then or afterward. The injection of air caused such pain that it was abandoned after a single trial; and tepid salt-water was selected as least irritating to mucous membranes, and so least likely to counteract its own mechanical action by exciting peristalsis. At first but four ounces could be introduced, owing to the pain it gave, and that was gradually expelled within a few minutes. After this, however, the injection excited no pain or tenesmus, and the boy said it was doing him good. By evening twelve ounces could be introduced at once.

Thursday morning, pulse 100; tenderness on pressure over tumor extending lower down; complete anorexia; as yet no fecal odor of fluid escaping from rectum. Same treatment continued, and in evening an injection of sixteen ounces was tolerated. Tumor thought to be slightly diminished, but some tympanites rendered this doubtful.

Friday morning, patient had slept most of the night, without desire to go to stool; pulse 70; tumor smaller and less tender; water from bowel occasionally brought with it small shreds of mucus tinged with blood; boy in good spirits, asking for food, and evidently better. At 10 A. M. an injection of eighteen

ounces. At 1 P. M. a small evacuation consisting of remains of this enema with a little moulded fæces—the first since Tuesday morning. Two hours later, after another injection, a similar passage. Examination now failed to find any tumor. The child declared himself well, and wanted to get up. He was kept in bed for a few days, but required no further treatment. This was fourteen months ago, and there had been no trouble since.

Our space compels but the briefest allusion to the remainder of the paper. It quoted authorities to prove that intussusception is much less rare than commonly supposed; spoke of its causes; and gave a detailed account of the symptoms and diagnostic points, insisting especially upon tenesmus as indicating that the large intestine is involved, though it may be in its upper portion. The main principles of treatment advocated have been indicated in our report of the case. Bella donna was thought to be a valuable adjunct to morphia in controlling peristalsis. The speaker had not found, in his reading, any mention of kneading the bowel, or of utilizing the weight of the liquid injected by keeping the pelvis high, which he regarded as of the greatest importance. It had been suggested to employ for injection glycerine more or less diluted, in order to get its osmotic action in depleting the congested bowel at the point of invagination. Experiments made by the speaker on the cadaver had shown that the ileum, artificially protruded through the ileo-cæcal valve, could be pushed back by the force of the breath. The attempt to force fluid through the valve, so as to reduce an invagination of the small intestine higher up, succeeded in two or three experiments on the cadaver without difficulty; in others it was impossible to send the fluid by the valve until a little manipulation removed the obstruction. In conclusion, the paper discussed and advocated the propriety of opening the peritoneal cavity in extreme cases, and applying taxis directly to the bowel affected.

Dr. Cooke had, winter before last, been called to a patient suffering from three or four days' constipation with tenesmus and mucous discharges, though he believed without blood. On introducing his finger into the rectum, preparatory to giv-

ing an injection, he felt the opening of an invaginated portion of bowel, much like the os uteri. He pushed it up as far as he could; and then, placing the patient on knees and elbows, forced it further by injection. This position had seemed to him a matter of course under the circumstances. The next morning the patient had no further tenesmus. Another injection was given, and in about twenty minutes he had a natural evacuation.

IRREGULARS AS PENSION EXAMINERS.

On motion of Dr. Chamberlain, the following resolutions, received from the Suffolk District Medical Society, of Boston, as passed at its meeting of 25th February, were read, and, by vote, indorsed as expressing the sense of this County Society:

Whereas, The Honorable Commissioner of the United States Army and Navy Pensions has recently dropped from the list of examining pension surgeons all irregular practitioners; and, whereas, strenuous efforts have been made both through the executive departments and through Congress for their reinstatement, and much ill feeling has been excited toward the Honorable Commissioner; and, whereas, a large number of the present examining surgeons served in the medical corps of the volunteer forces during the late war; and, whereas, none but regular physicians were admitted to that corps or to the medical corps of the regular army: therefore—

Resolved, That this Society approves the action of the Honorable Commissioner of Pensions in relieving from further duty, as examining surgeons, all except regular physicians, and respectfully requests the Honorable Secretary of the Interior to sustain the Honorable Commissioner in his action in this respect.

Resolved, That an official copy of the foregoing be transmitted to the Honorable Secretary of the Interior.

(Signed) GEO. C. SHATTUCK, M. D., *President.*
H. H. HAYDEN, M. D., *Secretary.*

The meeting adjourned.

Stated Meeting, April 3, 1871.

DR. ABRAM JACOBI, President, in the chair.

The President announced the admission to membership of Dr. J. Lewis Smith.

The report of the Committee on Intelligence was read by

Dr. Castle, and that of the Committee on Meteorology by Dr. Goodwillie.

ABSCESS OF APPENDIX VERMIFORMIS CÆCI.

Dr. Leonard Weber read a paper on this subject, which will appear in another number of this Journal.

Dr. Sands had seen Dr. Parker operate in two cases. In the first, related in the article referred to by Dr. Weber, the diagnosis had been undoubted; but in the second it was obscured by the absence of any circumscribed swelling, the feeling being that of deep-seated œdema of the parietes of the iliac fossa; yet Dr. Parker's experience enabled him to dispel the uncertainty, and to operate as successfully as in the former case. In the case under Dr. Parker's care, where the abscess had broken into the intestine, the patient had reached an extreme degree of prostration, and seemed on the verge of collapse; but with the evacuation of the abscess he began at once to mend.

In several of the cases which the speaker had seen he could not be sure whether the abscess was due to ulceration and perforation of the appendix, or to inflammation of the loose areolar tissue surrounding the cæcum. He supposed there was no doubt that abscess occurs from the last-named cause, and that the diagnosis must always be difficult. In one case to which he had recently been called in consultation, the diagnosis of perforation was rendered probable by the very marked gurgling felt in the abscess, and the large amount of fetid gas which rushed out when the incision was made. No foreign body was found.

Within the last eighteen months he had seen two cases of much interest. The first he had examined in consultation. A boy was taken sick with what was supposed to be some form of fever. The speaker had found him feverish, with a very prominent swelling in the right iliac fossa. The tumor was very firm to the touch, and gave no sign of fluctuation. There was no vomiting, and no evidence whatever of intestinal obstruction. On examination by the rectum, a prominent swelling was found crowding this bowel over to the left side. Dr. Parker was called in consultation, and thought that he

detected fluctuation; and it was decided to explore, the next day, perhaps through the rectum. But the next day the patient was more comfortable, and the exploration was postponed. The day following he continued to improve, and so on until all idea of interference was abandoned.

The other case was in Dr. Parker's practice. A man twenty-one years of age, had a non-fluctuating tumor, painful on pressure, in the right iliac fossa. The symptoms were of no great severity, and it was decided to await their development, and with the same result as in the last-named case. There were at no time any more positive signs of abscess; the tumor and the symptoms gradually disappeared, and the patient recovered. Such cases as these would seem to make it exceedingly difficult to decide whether operation is demanded or not.

Dr. Hanbury Smith had treated several cases of typhlitis, one of which he thought of sufficient interest to relate, translating and condensing from the Transactions of the Swedish Medical Society:

M. C. Lindström, fifty-three years of age, of athletic frame, and previously in perfect health, sickened on the 28th of February, 1843, with shivering, followed by fever and sweating, but, so far as she can remember, unaccompanied by pain. The next day, after having taken an emetic, and a powerful cathartic, she was suddenly seized with violent pain in the right iliac region, and vomiting of every thing swallowed. The pain increased, extending toward the back, and was particularly severe, deep in the right groin.

Called to the patient on the 4th of March; I found the following symptoms: decubitus, half on the back, half on the right side—could bear no other position; knees drawn up, trunk curved to meet them. The countenance, much sunk, expressed intense suffering. Skin covered with a cold, clammy sweat; feet cold. The respiratory act short, incomplete, performed solely by the aid of the thoracic muscles. Pulse somewhat accelerated, small and weak; tongue loaded and dry, but little thirst. Obstinate vomiting; no action of the bowels since she was taken sick. Abdomen tender on pressure, distended and tympanitic, with the exception of the right iliac

region, where the sound on percussion was dull. On a minute examination of this part, one could distinctly feel a swelling exquisitely sensitive to pressure, in which the patient felt a continued dull pain, with now and then a sense of cutting and stabbing. When she attempted to lie altogether on the right side, the suffering was unbearably increased, while she could bear to lie on the left side a few seconds, although that position occasioned a very painful dragging in the right groin and whole iliac region. She could not straighten out the right leg, the attempt occasioned so much pain in the same region. Urine very scanty, deep reddish-brown in color. No sleep since the commencement of her illness.

This group of symptoms, some of them pointing unmistakably to their cause, could only be referred to typhlitis, with probable abscess of the vermiform appendix.

The treatment was the well-known opiate, and need not be particularized.

After several very severe exacerbations, the symptoms began to ameliorate, appetite to return, and on the 21st, the patient still taking opium, a mild diarrhœa set in. On the 22d she voided at stool a false membrane forming a perfect cast of the inside of the cæcum and appendix, and bringing with it, from the bottom of the latter, a concretion of the size of a large pea—as far as could be determined without injuring the preparation, an enterolith or intestinal concretion. The patient continued to pass portions of pseudo-membrane for several days, after which she slowly recovered, though it was four months before she could move her right leg freely—some evidence of the extent of disease in the pericæcal tissues. When I saw her last, in the spring of 1847, she had continued to enjoy excellent health.

The preparation is now in the museum of the Carolinian Medico-Chirurgical Institute, at Stockholm, Sweden.

Dr. Krackowizer: I may mention a symptom which I did not hear described in the paper, and which I think I have noticed in a couple of cases, that is, a little difficulty in voiding the urine while the tumor is on the increase, showing evidently that the parts near the bladder are involved in the adhesions and false membranes which wall up the matter.

Among a number of fatal cases of this affection in my practice, I can relate but one of perfect recovery. A young man was taken with the symptoms which have been described, in the practice of a gentleman in Brooklyn. After a time Dr. Post was called in consultation, and, finding an evident abscess in the iliac fossa, he cut into it, with great relief to the patient. During the formation of the tumor, very general and serious peritonitis had occurred, which was controlled by opium. The patient soon recovered, and the wound healed; when, without known cause, unless too much exercise, the pain recurred, and peritonitis was lighted up afresh. Four or six weeks later, the same scene was reënacted. At this point I was called to see the patient, in consultation, and found general peritonitis well controlled under the opium-treatment. There was a fluctuating swelling in the right iliac fossa, and I had only to follow the cicatrix of the previous incisions, to give the matter exit. The patient was removed to this city, and the wound was nearly healed, when, as he was looking out of a window, a mad bull rushed through the street. Suddenly throwing up his hands, he felt a sharp pain in the old place; was taken down in the same way as before, and a new abscess formed, again to be discharged by incision. One morning, when he had for the fourth time nearly recovered, he noticed, as he threw the wet compress from the wound into the basin, a click which arrested his attention. It proved to be due to the seed of a pear or an apple. From that time the healing was very rapid, and there was no recurrence of the trouble. This was some thirteen years ago. I have since been in the habit of seeing the gentleman from time to time, and not the least trace of any tumor or tenderness can be found.

The most peculiar case I have had was that of a boy, in whom, without any symptoms that could be ascertained, an adhesion had formed in early infancy, between the vermiform appendix and the bladder, resulting in a cæco-vesical fistula. The first-noticed evidence of this was the voidance of an ascaris lumbricoides by the urethra, which occurred two or three times. Afterward the child was in the habit of passing liquid fecal matter with the urine. From the liquid character of the matters so voided, and from the short period after

taking food that the voidance occurred, it was judged that the adhesion could not be in the lower part of the colon. The patient died after an operation for stone, and the *post-mortem* examination revealed the condition just described.

Another case was somewhat curious. A microcephalic idiot, perfectly helpless, was the object of the tenderest care on the part of his parents. He was fed exclusively on milk up to his seventh year, only once in his life being given a few strawberries. He died with symptoms of ulceration of the vermiform appendix, in which the autopsy discovered two concretions, each having as its nucleus a strawberry-seed.

A point concerning the etiology of the affection has often occurred to me. Seeking the first of the series of pathological changes that led finally to the fatal result, we frequently find, in *post-mortem* examination of these cases, not only the recent exudations which had walled up the matter, until finally it broke through them into the peritoneal cavity; not only the ulceration and perforation of the appendix, but, besides these, adhesions apparently much older, binding down the appendix to surrounding parts. My impression is, that these first adhesions of the appendix, by their traction, render patulous its opening into the cæcum, and thus expose it to intrusion of seeds or other foreign bodies, about which form the fecal concretions which lead to ulceration. This point seems to me worthy of further investigation, to ascertain whether or not it is customary to find such adhesions of older date than the ulcerative process.

Dr. Weber thought that the apparently old adhesions of the appendix might be simply the first of those excited by the foreign body in the earlier stages of the ulceration. He was the more inclined to this view, since, in the majority of cases, there was no history of previous trouble in the iliac region.

Dr. S. Rogers, referring to one of Dr. Sands's cases, said that he had once been much alarmed, in introducing an exploring needle into what he supposed to be an abscess of the abdominal wall, at the profuse escape of gas of a thoroughly stercoraceous odor. His first thought was that the intestine might have been punctured, but pus soon followed, and incision gave vent to some two pints of it. He wished to inquire

if the condition of the iliac region for years after the affection had been noted in the paper. Dr. Krackowizer had related one case in which there were no subsequent signs or symptoms.

Dr. Weber said that he had mentioned the possibility of the disappearance of the abscess by absorption, and the possibility and even frequency of its evacuation into the intestine, leaving adhesions and thickening.

Dr. Rogers had been watching two cases with much interest, at intervals, for about five years. One, a gentleman of sixty, had all the symptoms of the affection, but had recovered. Up to the time when last seen, several years later, he still had a tumor at the seat of the old trouble, with an occasional twinge of pain there, though there had been no recurrence of the abscess. The other patient had acute and pretty general peritonitis. When first seen by the speaker, he had a red flush, like that seen over a forming abscess, covering a space some three inches in diameter in the right iliac fossa. Among the several physicians who had seen him, one of much experience was said to have diagnosticated perforation of the appendix. The patient's suffering was great, and all the symptoms were very grave. Half a dozen leeches were applied over the red spot above mentioned, semi-narcotism was induced by morphia, and in the course of six hours there occurred a large spontaneous passage from the bowels, the first in six days. There were no untoward symptoms after that; but the man had had a tumor at that point ever since, which now and then would be painful and tender.

DEATH OF DR. UNDERHILL.

Dr. E. C. Harwood, from the committee appointed February 13th, to prepare resolutions on the death of Dr. Richard T. Underhill, reported the following, which were adopted:

Whereas, Through the dispensation of an All-wise Providence, Dr. Richard T. Underhill's fellowship with us has been severed by death, and whereas we desire to express the high esteem and regard in which we hold his memory:

Resolved, That in his private, professional and public life the late Dr. Underhill exemplified many of the highest attributes of human nature; that his sterling integrity, noble character, and genial temperament, endeared him to all who knew him well.

Resolved, That, while we feel sorrow at our loss, we realize that the deepest grief saddens the hearts that were bound to his by the closer ties of relationship; and that we extend to the bereaved family and relatives our sincere sympathy and condolence.

Resolved, That an authenticated copy of the foregoing be sent to the family of the late Dr. Underhill, and that the same be furnished to the medical journals of this city for publication.

The meeting adjourned.

Bibliographical and Literary Notes.

ART. I.—*Practical Lithotomy and Lithotrity; or, an Inquiry into the Best Modes of removing Stone from the Bladder.* By SIR HENRY THOMPSON, Surgeon Extraordinary to H. M. the King of the Belgians, Professor of Clinical Surgery, and Surgeon to University College Hospital. Second edition, considerably enlarged. London: J. A. Churchill, 1871, 8vo, pp. 327.

EIGHT years ago the first edition of this work was published, and the increased experience of the author, since the death of Civiale, the highest authority concerning the management of calculous disorders, is recorded in the present one. The habit of carefully watching and making full notes of every case under his care enables him to present in a compact way the product of his inquiry as to the results of the several kinds of operative methods, and to make many practical suggestions. Three chapters are new: the seventh, on the results of lithotomy; the twelfth, on the employment of lithotrity in cases where, besides calculus, serious organic disease or other complication exists; and the thirteenth, on the results of lithotrity. An appendix, containing brief details of two hundred and four cases of lithotrity occurring in the practice of the author, has been reprinted from the last volume of the "Medico-Chirurgical Transactions."

Sir Henry's own inquiry into the true result of the lateral method before lithotrity was general, based on complete analyses of 1,827 cases, is particularly valuable and interesting. It will be much less easy and trustworthy to estimate its real

capabilities hereafter, for lithotomy is no longer examined under the conditions of the past, owing to the success and general adoption of the crushing operation. Immense labor, care, and judgment, were required to obtain valid numerical results. These are shown in a table giving at a glance the simplest and truest aspect of the subject. Of the 1,827 cases there were 229 deaths. In studying the table, we see what lateral lithotomy is capable of effecting at various ages. From 1 to 5 years inclusive 1 death happens in about 14 cases; between 6 and 11 the mortality rate falls to only 1 in 23½; it rises as we pass from 12 to 16, to 1 in 9½, the increased susceptibilities of the puberty period telling; and thence to the 20th year, when it reaches 1 in 7. Up to the 30th year it slightly improves, being until then about 1 in 8 cases. Between the 30th and 38th year it diminishes to 1 in 10½; but during the succeeding 10 years, when organic changes begin to set in, or depraved habits affect the constitution, the rate rises to 1 in 6. The causes become more potent, while at the same time the powers of life lessen from 50 to 70, the rate being between 48 and 58 years, 1 in 4¾, reaching gradually to 1 in 3¾ between 58 and 70, and finally to 1 in little more than 3 between 70 and 80. We have, then, two great groups separated from each other by the event of puberty. In the first, ceasing when adolescence begins, say at 16 years, and comprising more than one-half of the entire number of cases analyzed, we have a mortality of 1 in 15½. In the second group, including all ages above 16 years, there are 800 cases, with 161 deaths, giving a mean of more than 1 death to every 5 cases. The author remarks: "And it may be said that this is the total to which the results of lithotrity are to be brought, for purposes of comparison, since that operation is applicable to adults alone." He adds: "At the present time, almost all the cases of small stone, and those occurring among the healthy patients, at all events, are submitted to lithotrity. For some time past, and in the future, lithotomy in adults must be regarded as an operation almost exclusively applicable to unusually large stones, and often to patients in bad health. Instead of looking for one death in four or five cases, which I have shown to be a good

result among average adults, we shall find a much larger proportion of fatal consequences" (p. 144).

More experience and larger data are required to determine the real relative risks of the two operations within the present conditions. Sir Henry Thompson states that, while Sir William Fergusson's and the late Dr. Keith's (of Aberdeen) figures show, the first an equal number submitted to each operation, and the second three-fifths cut and two-fifths crushed, he has at present applied lithotrity to *five out of every six cases* of adult patients who have applied to him, and with total results with which he has ample reason to be satisfied. Still, he writes: "I am by no means clear that any one can at present determine a rule which shall be even approximative as to the proportion which will give the best product. . . . . The solution of this problem, so far as it is possible, may be hoped for at no distant period. A very few years more will afford us several hundred cases in the relative proportions just named."

Respecting the mortality of other forms of lithotomy besides the lateral, Mr. Allarton furnishes a record of 139 median lithotomies, of all ages, with 13 deaths, or 1 in 11 cases. Mr. Cadge, of Norwich, says that the median operations, amounting to between forty and fifty, are fatal to about the same extent as the lateral method. Dr. Buchanan reports sixty cases of his operation, performed by several surgeons, with the same result as shown by Allarton's table. Of the medio-bilateral operation, Sir Henry says he has performed it in a few cases, believing, at one time, that it might present some advantages over lateral lithotomy, in large stones, and in elderly and infirm men, but he has not found this to be the case. The hæmorrhage was often large and troublesome, the rectum was easily wounded from its necessarily close proximity to the incision for a large stone, not always perhaps by the knife, but by the removal of the stone tearing the thin septum between the wound and the bowel. For these reasons he has abandoned the operation.

In treating of the recovery-rate in lithotrity, an analysis is given of 204 consecutive cases all adults, and for the most part of advanced age, the mean being rather more than 61 years. The deaths from all causes during or after the conclu-

sion of treatment were 13, a recovery-rate of 93½ per cent. His first 84 cases include 4 deaths, or a rate of 95 per cent. of recovery. The last hundred were a little less promising, and the result was even better than the preceding series. This important statement is made: "*I have never lost a single patient, in the whole course of my experience, after crushing a stone which was no larger than a small nut*" (p. 263).

The great advantages of the cylindrical handle to the lithotrite, the author's own design, enabling the operator to use the instrument with an ease and nicety which can be obtained with no other, from the ability to manipulate it with the lightest possible hold, by the finger and thumb, and thus detect the smallest fragment, is particularly insisted on. We may remark that it is this form of handle, insuring greater delicacy of touch and easier manipulation, which gives to Sir Henry's searcher its great advantage over every other form of sound for exploring the bladder for stone, though there is much value in the abrupt curved short beak. With regard to the operation, preliminary injections, so long invariably used, are declared unnecessary, nor is it important for the patient to be directed to retain his water; "indeed, his very attempt to do so would often defeat the object; added to which, some nervous anxiety beforehand would often compel him to pass water immediately before or at the surgeon's arrival." For rules governing the conduct of the operation, we refer our surgical readers to the work, which all should have in their library.

Art. II.—*The Pathology and Treatment of Venereal Diseases, including the Results of Recent Investigations upon the Subject.* By Freeman J. Bumstead, M. D., Professor of Venereal Diseases at the College of Physicians and Surgeons, New York, etc. Third edition, revised and enlarged. Philadelphia: Henry C. Lea, 1870, 8vo, pp. 704.

In casting a retrospective glance over the field of medical or surgical science, there will be found no department in which, during the past ten years, such radical changes and advances have been made as in that of venereal diseases.

Ten years ago the Professor of Surgery in the largest medical school in the country was teaching his pupils that gonorrhœa was a form of syphilis which was liable to be succeeded by constitutional syphilitic disease; and the teaching of Ricard, which then combated this notion and asserted the non-syphilitic character of clap, yet gravely claimed that a positive result following the inoculation of matter, from any venereal sore, was an unerring proof of its syphilitic nature. Ten years ago there were probably not half a dozen medical men to be found in this country who recognized any essential difference between venereal ulcerations following exposure, all being indiscriminately treated with mercurials. Much less were other important points recognized, if even suspected, such as the immediate development of the chancroid, the incubation of the chancre, the contagiousness of secondary lesions, the fact that acquired syphilis always commences with an initial lesion, etc. The changes which have taken place in this single decade are matters of historical interest, and are so great that they can hardly be appreciated by those whose medical education is of recent date. The general intelligence which to-day prevails in the medical profession throughout this country, in regard to all the important features in the nature, development, and management of venereal diseases, contrasts so vividly with the general ignorance which existed in regard to them ten short years ago, that we cannot help referring to it in an emphatic way at this time in order to give to Dr. Bumstead the credit to which we believe he is justly entitled, namely, of having been largely instrumental in educating the profession of this country in these important matters. This he has done by his writings in the leading medical journals, and by his lectures at the College of Physicians and Surgeons, but chiefly through the medium of the book whose title stands at the head of this article.

The first edition of "Bumstead on Venereal" appeared in the autumn of 1861, and, without assuming to be founded as to its doctrines upon the personal observation of the author, it was yet the first embodiment in the English, or in any other language, of views which were lying like *membra disjecta*, scattered here and there in foreign tongues, in medical and in short special treatises. When these views were brought to-

gether, forming one systematic work, it seemed a simple matter to have accomplished it; but the attempt, though successful, was a bold one, especially for so young a man as Dr. Bumstead was at that time, and yet it could scarcely have been done except by a young man not then too firmly set in his opinions.

Dr. Bumstead's treatise was most cordially received by the profession both in this country and in England, and was, besides, translated into the Italian and published at Milan. The first two editions (the second of which was stereotyped) ran through a large number of copies, and we are glad now to welcome the third, which we believe will fully maintain the reputation of the former. Not that we do not find in the volume some omissions which we would have been glad to see supplied, and some portions which we think might still be amended; yet, mindful of the impossibility of compressing all that might be said to advantage upon the various subjects into a single volume, we can certainly agree with the London *Lancet* in saying of the present edition that "it is the best treatise upon venereal diseases in the English language."

Our space will not allow us to more than mention the changes which have been made in this edition.

Part I., treating of gonorrhœa and its complications, has not been materially altered except in the chapter on stricture. In this Dr. Bumstead advocates internal urethrotomy and rupture, as preferable to the tedious treatment by dilatation, and also in preference to the more dangerous operation of perineal section, unless in those cases of fistulæ and impermeable stricture, where the latter operation alone can avail. This chapter is illustrated by excellent wood engravings of recent instruments, several of which have been improved by modifications suggested by the author, as we have reason to know in our own practice. The adoption of the French catheter scale in place of the English is warmly advocated, and meets with our hearty approval.

Part II., relating to the chancroid, and including buboes, has been rewritten, and the diagnosis and treatment of these affections are given more in detail than in the former editions.

Part III., relating to syphilis, is greatly enlarged. Syphilitic affections of the brain and nervous system, of the viscera,

the muscles, bones, etc., have been brought up to the present level of our knowledge, and as fully as we could desire in a work designed for a text-book and as a practical guide for the medical practitioner.

Since the publication of the second edition of his work Dr. Bumstead has had a favorable opportunity for observing the process and results of so-called syphilization as practised by its chief and almost its only advocate, Prof. W. Boeck. As most of our readers are aware, Prof. Boeck spent the winter of last year in this country, and the venereal wards of the Charity Hospital were placed at his disposal by Dr. Bumstead, for the trial of his (the professor's) especial mode of treatment. A few cases only, it appears, could be persuaded to submit to the syphilizing process, and those who died complained bitterly of the pain and soreness of the inoculated points—several eloped, in consequence of their dissatisfaction, before the treatment was complete. In those who remained the eruptions faded out under the inoculating plan, but it is asserted that mucous patches and condylomata were found to require the ordinary local treatment, in addition to the ulcerative procedure. For our own part, having seen these cases while they were suffering under the syphilizing process, we confess to a profound sympathy with those who ran away, and our only wonder ever since has been that any one not confined by prison walls has ever submitted to this treatment. Dr. Bumstead appears to us to have strained a point in saying that syphilization is an "effective" treatment, for he attributes to the depurative action of the repeated ulcerations alone the apparent benefit seen in some of the cases, and, on the whole, with the kindest expressions toward Prof. Boeck, is not inclined to recommend his treatment for general adoption.

Art. III.—*The Jurisprudence of Medicine in its Relations to the Law of Contracts, Torts, and Evidence, with a Supplement on the Liabilities of Venders of Drugs.* By John Ordronaux, LL. B., M. D., Professor of Medical Jurisprudence in the Law School of Columbia College, New York, etc., etc. Philadelphia: T. & J. W. Johnson & Co., 1869, 8vo, pp. 310.

No branch of medical science has been more neglected than that of jurisprudence; for this there are many reasons, but the principal one is that books upon the subject have been so voluminous that practitioners have not had the time to read them. Prof. Ordronaux has given us, in his recent work, a compendium of what is known of the jurisprudence of medicine, containing, in a condensed form, much that is absolutely necessary for a physician to know, who pretends to be up to the times.

The table of contents will not be out of place, and will speak the merits of the book better than we are able in a review.

Part I. treats of the rights, remedies, and liabilities of physicians. In regard to this section, the author, in his preface, says: "Having often been consulted by physicians in relation to their professional rights at law, and being compelled, in verification of my opinion, to search for precedents, or, in the absence of recorded adjudications, to seek for analogies outside of any works on the positive law of contracts, I became long ago convinced that there existed a definite and well-marked branch of the department of obligations, upon which no systematic collection or exposition of principles had yet appeared, in the form of a distinct treatise. This neglected chapter in the law of mandates, treating of the rights, remedies, and liabilities of an entire profession, as parties to consensual obligations relatingto the rendition of personal services, I have undertaken to fashion into a legal entity, by bringing it under the light of positive law, both ancient and modern." Under this division we find legal status of physicians—contract between physicians and patients, its nature, prerequisites, and obligations—fees and remedies at

law—personal liabilities—malpractice, civil and criminal, etc., etc.

Part II. treats of medical evidence.

Part III. is on the ethics of medicine, and contains the Hippocratic oath and the code of ethics of the American Medical Association.

Part IV., on the jurisprudence of pharmacy, sets at rest the long-mooted discussion of the right to prescriptions, and the relation of druggist to physician.

The book supplies a want long felt, and fills a gap in medical and legal literature, which has long existed. It is also of especial value from the fact that Prof. Ordronaux has here collected every case on record, in the published reports of courts of law in the United States, where suits involving any of the questions above referred to have been carried to a litigation.

Art. IV.—*On Aural Catarrh and Curable Deafness.* By Dr. Peter Allen. Published by J. & A. Churchill. London: 1871, pp. 277.

On the particular part of ear-diseases of which this book treats, it is probably the most satisfactory that has been written. The combination of physiology and pathology, if we may so say, or the effect of morbid changes on the natural functions, is very thoroughly worked up in this, as in some other recent medical works which have become very popular.

The subjects treated of are obstructions of the Eustachian tube, acute and chronic catarrh, of the middle ear, and purulent inflammation of the same.

In the way of examining the membrana tympani, Dr. Allen has nothing better than Von Troltsch's ear-mirror and Gruber's speculum to offer; in fact, it will probably be long before any improvement on this method of illumination will be offered. He frequently mentions a modification of Politzer's air-bag, which consists in having a valve made to permit air to enter the bag readily without being sucked back through the nozzle, for fear of drawing back mucus from the nostrils.

We have found the same end to be attained as effectually and more simply by a small round hole in the side of the air-bag; during the act of compressing the bag this opening may be closed by the finger or thumb, and it may be uncovered while the bag is expanding. Another change in Politzer's air-bag is the addition of an elastic tube, terminating in a forked tube with pads at the end, to fit *against* the nostrils instead of being inserted *into* either of them.

The author describes a modification of the tympano-manometer by placing it against a scale, so that the motion of the fluid in it may be more readily observed.

In some cases of accumulation of inspissated mucus in the middle ear, injections of saline solutions are recommended. The use of bougies in the treatment of obstructions of the Eustachian tubes is mentioned as applicable to certain cases, but we are pleased to see that it is not strongly recommended.

Quite an analogy is drawn between the action of the tensor and laxator tympani muscles, in accommodating for sounds and that of the ciliary muscles in visual accommodation.

The epithema, an "ever-ready poultice and fomenting pad," is something that we have often tried with satisfactory results. It is made of "flat pieces of sponge sewn up in fine linen, and a soft external water-proof covering." The sponge is to be soaked in warm water, medicated or otherwise, and applied over the ear.

The author speaks of intentionally rupturing the drum membrane by forcibly inflating the middle ear in cases of purulent inflammation, thus giving escape to the pus contained in that cavity. The perforation thus made remains open as long as the purulent secretion from the tympanum continues. If the drum may be thus intentionally ruptured by the use of Politzer's air-bag, it is strange that it should not occur more frequently, for the operation is very often performed in cases of acute and chronic inflammation, and, even where the drum membrane has been very much thinned, we have never seen it ruptured in this manner.

Dr. Allen has "never been able to discover one well-authenticated case where disease in the head has supervened as a consequence of checking otorrhœa," if there had been no caries of the temporal bone.

Some months since we received from Dr. S. W. Butler, of Philadelphia, a copy of a prescription-book, or rather a collection of prescription-blanks, bound in book-form. The object of the publication was to enable the physician to keep a record of his prescriptions in different cases, the leaves being punched and so arranged, as we remember it, that the prescription intended for the patient could be easily torn out. Some acquisitive friend, whose ideas of the distinction between *meum* and *tuum* seem to have been a little mixed, or who possibly entertained, as many seem to, the opinion that editors have no proprietary rights whatever in books, walked off with the volume on the very day of its reception. Should remorse or repentance ever seize upon him, we trust he will convey to Dr. Butler his impressions of the value of the book, and thus make amends for depriving us of the pleasure of so doing.

We have received volumes i. and ii. of the *American Journal of Obstetrics.* They are neatly bound, and present a very attractive appearance. The country has furnished no journal devoted to a specialty which has acquired so enviable a reputation, or achieved so excellent a success, as the *Obstetrical*, as it is commonly called. Its original articles have been of the highest character, and many of them have presented positive additions to our professional knowledge, and are already quoted as authority. Dr. Dawson, the managing editor, has now become the propietor of the Journal, and we wish him every support and encouragement in his work, which is a credit to our city and country.

Dr. Hermann Nothnagle, of Berlin, has published a Hand-book of Materia Medica, which is highly spoken of by some of our exchanges.

Another medical journal has been established in Georgia, under the title of the *Medical and Surgical Repertory.* It is a semi-monthly, of sixteen pages octavo, and is published at Griffin. The editors are Drs. E. F. and J. J. Knott.

Kansas, too, furnishes another candidate for public favor—the *Kansas City Medical Journal*—a substantial octavo of 86 pages, and published at the very low rate of two dollars per

annum. It is edited by A. P. Lankford, M. D. The first number, which has just reached us, is unusually rich and varied in its table of contents, and it contains a number of articles, both original and selected, of sterling value.

Prof. Joseph Jones, M. D., of the University of Louisiana, is engaged in preparing for the press a volume of Medical and Surgical Memoirs. This work will embrace the investigations of fifteen years into the causes, geographical distribution, natural history, and treatment of intermittent, remittent, and congestive malarial fevers, yellow fever, typhoid and typhus fevers, small-pox, spurious vaccination, measles, pneumonia, diarrhœa, dysentery, scurvy, tetanus, cerebro-spinal meningitis, diseases supervening upon gunshot-wounds, pyæmia, hospital gangrene, erysipelas, etc.

The results of the investigation of the diseases of the Confederate army, during the American civil war, 1861–1865, will occupy a prominent portion of the work.

These investigations have been prosecuted unremittingly during the past fifteen years; and the author proposes to lay the results before the medical profession as soon as a sufficient number of subscribers has been obtained.

Physicians and others, desiring to become subscribers, will please foward their names direct to Dr. Jones, at New Orleans, La.

Announcements of New Publications.—Messrs. Lindsay & Blakiston, of Philadelphia, have in preparation the following new books and new editions:

Sweringen's Pharmaceutical Lexicon, a Dictionary of Pharmaceutical Science, 1 vol., 8vo.—Beale on Diseases of the Liver and their Treatment. A new revised and enlarged edition.—Fuller on Diseases of the Heart and Great Vessels. 2d edition.—Trousseau's Lectures on Clinical Medicine, vol. iv.—Wedl's Dental Pathology, translated from the German, with Illustrations.—Duchenne's Localized Electrization, with notes and additions by the Translator, and numerous Illustrations.—Fuller on Rheumatism, Rheumatic Gout, etc., etc. A new and enlarged edition.—Pereira's Prescription Book. A new Ameri-

can, from the fifteenth London edition.—Tanner and Meadow's Practical Treatise on the Diseases of Infancy and Childhood, second edition, revised and enlarged.—Lindsay and Blakiston's Physician's Visiting List for 1872. Various sizes and styles of binding.—Hood's Treatise on Gout, Rheumatism, and the Allied Affections.

The Sydenham Society's Publications for 1871 are: Wunderlich on the Use of the Thermometer in Disease. Translated, with Notes, by Dr. Woodman.—A Biennial Retrospect of Medicine and Surgery for the Years 1869 and 1870. Edited by Mr. Power, Dr. Shepherd, Mr. Warren Tay, Dr. Barnes, Mr. Carter, and Dr. Stevenson.—Trousseau's Lectures on Clinical Medicine, vol. iv. Translated by Dr. Rose Cormack.—The Eleventh Fasciculus of the Atlas of Portraits of Skin Diseases. Also a Second Part of Vol. xl., being a Descriptive Catalogue of the Portraits of Skin Diseases, compiled by Mr. Hutchinson.

Messrs. D. Appleton & Co. announce for publication: Management of Infancy, Physiological and Moral, etc. By Andrew Combe, M. D. From the tenth English edition. Revised and edited by the late Sir James Clark, Bart., K. C. B., M. D., F. R. S., Physician in Ordinary to the Queen. Also, the Posthumous Works of Sir James Y. Simpson, M. D., a full description of which may be found in our advertising pages.

Mr. Sampson Gamgee, of the Queen's Hospital, Birmingham, has nearly ready a work on the Treatment of Fractures of the Limbs.

Books and Pamphlets Received.—American Association for the Cure of Inebriates. Proceedings of the first meeting held in New York, November 29 and 30, 1870. Pamphlet, pp. 84.

Physician's Report of the Hospital of Auburn Prison, New York. Pamphlet, pp. 21.

An Essay on the Mechanism of the Ossicles of the Ear. By Albert H. Buck, M.D. New York: William Wood & Co. Pamphlet, pp. 18, with woodcuts and two full-page lithographs.

First Annual Report of the Board of Directors of the Manhattan Eye and Ear Hospital, New York City. Pamphlet, pp. 24.

Fifty-seventh Annual Report of the Trustees of the Massachusetts General Hospital, for 1870. Pamphlet, pp. 44.

Report of the Brooklyn City Hospital, 1870. Pamphlet, pp. 39.

Miscellaneous and Scientific Notes.

A Chapter of the O. Æ. Society has been established, at the Long Island College Hospital of Brooklyn. The designation is the "Mott Chapter," and is we believe the first offshoot from the parent society, which for several years has been in full operation at the Bellevue Hospital Medical College of this city.

We regret to notice the decease of the distinguished Dr. Felix von Niemeyer, author of the well-known work on the Practice of Medicine, which has met with such a remarkable success in this country and in England, through the translation by Drs. Hackley and Humphreys. We have no particulars of Niemeyer's case, except that he had recently returned from France, where he had been engaged in studying typhus and dysentery in the army. At the time of his return he was sick, but his illness was not believed then to be of a serious character.

Appointments.—At a meeting of the Faculty of the Bellevue Hospital Medical College, held April 4, 1871, Dr. Wm. T. Lusk was appointed Professor of Obstetrics and Diseases of Women and Children, vacancy caused by the death of Prof. George T. Elliot. Dr. E. L. Keyes was appointed Lecturer on Dermatology, *vice* Prof. Foster Swift, resigned. Drs. Polk and Roberts were appointed Assistant Demonstrators of Anatomy.

Dr. Richard Inglis has been appointed Professor of Obstetrics in the Detroit Medical College. Prof. E. W. Jenks, the former incumbent, retains the chair of Diseases of Women and Children.

Dr. E. L. Janeway, of this city, has been appointed Professor of Pathological Anatomy in the Medical Department of the University of New York, an original vacancy.

Deaths from Chloroform.—These unfortunate cases are accumulating so rapidly, that we cannot find space to give histories or details regarding them. We purpose therefore in the future to put on record simply a reference to the original report of all cases that we find published.

Prof. Wm. T. Briggs, M. D., of the University of Nashville, relates a case in the *Nashville Journal of Medicine and Surgery*, for February, 1871. He introduces his remarks in the following suggestive manner:

I had been using chloroform so long and so frequently in my practice, and with such satisfaction, that I was fain to believe that death would never take place from its effects, if it was properly administered.

In a lecture on the subject of anæsthesia, delivered to our class but a few weeks since, I gave a decided preference to chloroform over all other anæsthetics, because, while it was more pleasant, prompt, and powerful, I was satisfied that, with proper care, death would result very rarely, if ever, from its action.

In less than a month after my confident assertion to the contrary, death *did* result, during its administration, to a patient in my own practice.

In the *Denver Daily Tribune* of March 3, 1871, there is recorded the case of one Jeremiah Murphy, who died on Thursday, March 27th, while under the influence of chloroform, which he had inhaled for the purpose of having a wound, left by amputation of a finger, dressed. He had taken chloroform on the Monday and Wednesday previous to his death. Less than half an ounce was inhaled. Dr. F. J. Bancroft was the operator.

Dr. W. W. Dawson, Surgeon to the Cincinnati Hospital, in a very able article in the *Cincinnati Lancet and Observer*, of January, 1871, reports at length the cases to which we referred in our February number. From this detailed report it appears that twelve out of the cases we alluded to had hitherto been unpublished, instead of seven as we stated.

A robust man, aged twenty-eight, died recently at the London Hospital, about three minutes after the completion of an operation for fistula in ano, which had occupied not more than two or three minutes. He had taken chloroform without any unusual difficulty, and had lain during the operation on his left side; his pulse had been good throughout. The operation being completed, he was replaced on his back, and immediately ceased to breathe, and became livid in the face. Meanwhile the heart continued to beat regularly, though feebly.

After artificial respiration had been employed for a few minutes, he breathed normally for a few seconds, and then both breathing and pulse ceased altogether. Artificial respiration was carried on for forty minutes without avail.

The heart was found to weigh fourteen ounces; the left ventricle, the walls of which were pale and flaccid, and covered externally with only a thin layer of fat, was full of dark fluid blood; the mitral orifice freely admitted the tips of four fingers. The muscular fibres of the heart were found under the microscope to contain an abundance of fat-globules. The lungs were congested and œdematous; the pulmonary artery was full of blood. The stomach was empty and healthy; the spleen large and soft. The brain and kidneys were normal. The blood was everywhere fluid.—*Lancet*, December 24, 1870.

Another case is reported in the *Lancet* for January 28, 1871, as having occurred at the Westminster Ophthalmic Hospital. The patient, aged fifty-two, had a drachm and a half of chloroform administered to him upon a cone of flannel, to produce anæsthesia, while Mr. Power performed an iridectomy upon him. After the completion of the operation, he began to breathe stertorously, and in a few minutes later died.

Mr. Thomas Keith, of Edinburgh, has published his second series of fifty cases of ovariotomy.

Of the one hundred operations there were eighty-one recoveries. There has been a gain of six per cent. in the last fifty, while those who died survived the operation longer. In the first series death took place, on the average, in the course of the third day; in the latter, during the tenth day. The mortality toward the end would probably have been less had it not been for the accidental circumstance that several of the tumors were cancerous. No malignant tumor was met with till the sixty-first case. This patient recovered after a very severe operation, remained perfectly well for eight months, and died within a year from cancer of the peritonæum. Taking the cases altogether, the operations were quite as severe as the first fifty. Many of them were badly-constitutioned women, and not a few had sought relief elsewhere in vain.

When practicable, the extra-peritoneal method of treating the pedicle has been adhered to. On the whole, greater success will probably follow this than any other single method, especially when we have to do with a bad general condition. Thus in forty clamp cases (from the forty-fifth to the eighty-fifth) there were three deaths; and in neither of them had this way of treating the pedicle any thing to do with the result.

Ligatures on the pedicle have also once or twice been cut short, and returned; sometimes they have been left hanging out at the wound; and of late the cautery has been several times used with excellent results. Each method has advantages in certain cases.

Of the whole number of operations, seventy were treated in the same room. Of these, sixty recovered. Nearly all the worst operations were performed there. The greater number of those who died were poor, worn-out women, who came late in the disease. The mortality would probably have been much lower if there had been earlier operation in many of them; not that small tumors giving little trouble should be removed, for, on the whole, cases do best where the tumors are large and the general health somewhat impaired. There is, however, a stage in the progress of almost every case of ovarian disease in which operation is safe; and if this favorable time be allowed to pass, no care or skill can make up for it.

In this report Mr. Keith also relates briefly the prominent features of sixteen cases, "as a sort of balance-sheet, by which the value of the operative results may be judged," in which the operation was declined. The list comprises all the cases seen during the period in which the fifty were under observation and treatment, excepting, of course, a few in which the disease was just commencing, or so simple as not yet to call for a decision of the question of resort to operation.

The Comparative Value of Ether and Chloroform in Ovariotomy.—Mr. Keith, in the paper just now quoted and referred to (*Lancet*, August 20, 1870), puts on record his opinion of the comparative value of these two anæsthetics. He says:

In my early cases I frequently had to deplore the injurious effects of chloroform-vomiting in ovariotomy, and so evident was the mischief occasioned by it in this unfortunate case, that I have since then entirely abandoned the use of this agent in ovariotomy and other severe and tedious operations, and now use instead anhydrous sulphuric ether, made from methylated alcohol, administered through Dr. Richardson's apparatus. The oftener it has been given the more I like it. How chloroform so quickly superseded it is a marvel. The anæsthesia of ether, though at first slower, is extremely steady and quiet. There is infinitely less vomiting than with chloroform, and instead of the pallid face and feeble pulse of chloroform, the patient, after a long operation, is put to bed with a flushed face and a great surface-circulation. In cases

of non-adherent tumor, vomiting is, I fancy, of little consequence; but when there has been extensive adhesion, and when oozing may be set up by it after the wound is closed, vomiting can be no trifle, and will turn the scale. Sulphuric ether has now been used—at first with a small proportion of chloroform—in fifty-three cases of ovariotomy (of which forty-six recovered), and I think that something has been gained from the use of it. I would put in a word for the old anæsthetic. Chloroform certainly saves the surgeon five or ten minutes of time, and a little trouble. Had it never been heard of, I doubt if humanity would have suffered from the want of it.

Graduates in Medicine for 1871.—We have gathered from our exchanges the following statistics:

Buffalo Medical College, Buffalo, N. Y.	39
Bellevue Hospital Medical College, New York	135
College of Physicians and Surgeons, New York	85
Medical Department, University of New York	90
Women's Medical College, Boston, Mass.	4
Female Medical College, Chicago, Ill	3
Jefferson Medical College, Philadelphia, Pa.	127
University Pennsylvania, Philadelphia, Pa.	114
Iowa Medical College	32
Miami Medical College, Cincinnati, Ohio.	53
Medical College of Ohio, Cincinnati, Ohio	50
Cincinnati College of Medicine, Cincinnati, Ohio	17
University of Nashville, Nashville, Tenn	66
Indiana Medical College, Indianapolis, Ind	30
Massachusetts Medical College, Boston	45
Rush Medical College, Chicago, Ill.	83
Washington University, Baltimore, Md	39

Prof. John M. Maisch succeeds Prof. William Procter in the editorship of the *American Journal of Pharmacy.* Prof. Maisch has for years been identified with the advance of pharmacy in this country, and has been a frequent contributor to the journal of which he now assumes the control.

The Boylston Prizes for 1872.—The following are the questions proposed for 1872:

1. The Pathology of the Malignant and Semi-Malignant Growths.

The author of a dissertation on this subject, considered worthy of a prize, will be entitled to a premium of *two hundred dollars.*

2. The Pathology and Treatment of Sunstroke.

The author of a dissertation on this subject, considered worthy of a prize, will be entitled to a premium of *one hundred and fifty dollars.*

Dissertations on these subjects must be transmitted as above, on or before the first Wednesday in April, 1872.

Each dissertation must be accompanied by a sealed packet, on which shall be written some device or sentence, and within which shall be enclosed the author's name and residence. The same device or sentence is to be written on the dissertation to which the packet is attached.

The writer of each dissertation is expected to transmit his communication to the President, John Jeffries, M. D., in a legible handwriting, and with the pages properly secured together, within the time specified.

All unsuccessful dissertations are deposited with the Secretary, from whom they may be obtained, with the sealed packet unopened, if called for within one year after they have been received.

Hypertrophied Placenta.—M. Lubac presented to the *Société des Sciences Médicales de Lyon* a placenta, with the following note of the case:

The patient was a primipara, twenty years old, having never had any previous sickness, and in whom no traces of syphilis could be found; her pregnancy did not present at first any accidents, but toward the sixth month the movements of the fœtus ceased suddenly, and one month later—that is to say, at the seventh month of gestation—she was delivered of a dead child.

The fœtus, examined two hours after parturition, presented nothing worthy of notice. The placenta attracted attention by its enormous size and its marked friability. Compared with a healthy placenta at term, it presented the following considerable differences: While the normal placenta weighed four hundred and eighty grammes, the other, which was two months younger, weighed nine hundred and twenty-two grammes, or nearly twice as much. This increase in weight was not in the least dependent upon a serous or sanguineous infiltration; the placenta was almost bloodless, and presented no trace of serosity. How could this increase in weight and friability be accounted for? The microscopic examination made by M. Delore showed that the placental tufts were enormously enlarged, and that their diameter was double and even treble the usual size. This increase was very apparent when compared with the normal villosities. There was not, at least as far as a rapid examination could determine, any

elements of new formation in the thickness of the villosities, only a pure and simple hypertrophy.

Here, then, is a placenta belonging to a six-months' child, expelled at the end of the seventh month, of double the weight of a placenta at term. Similar cases are rare, and not usually mentioned by authors. M. Delore met with several such, but he has noticed that this placental hypertrophy was attended almost always with the death of the fœtus, and its maceration in the uterine cavity for a greater or less time. The author contents himself with stating this coincidence, not being able to give this phenomenon a sufficient explanation.—*Lyon Médicale*, January, 1870.

Castration in Epilepsy.—Dr. Mackenzie Bacon publishes, in the *Practitioner* of September, 1870, a communication in reference to a case which he had reported in the same journal for June, 1869. He says:

It may be interesting to give the sequel, as eighteen months have now passed by, and this period is probably sufficient to test the influence of the operation on the epileptic state.

The results are as follows:

The lad has improved in health and general condition; is fat, and weighs 11 st. 4 lbs., as against 8 st. 9 lbs. eighteen months before.

He has considerably improved in intelligence, and is able to make himself useful in simple work.

He has ceased to masturbate, and seems to have no sexual inclination, but there is no apparent effeminacy of character.

He used to have the fits several times a week, but, since the operation, the frequency of his fits has been diminished thus: In January, 1869, he had 2 fits; February, 2; March, 1; April, 2; May, 4; June, none; July, none; August, 3; September, 4; October, 1; November, 1; December, 2; January, 1870, none; February, 2; March, none; April, 1; May, 2; June, 1.

In my opinion, the above facts are enough to prove that the operation was, in this case, successful, and I remain convinced, for the reasons I gave in my former paper, that it is one which might be performed with vast benefit on a number of the insane epileptic class.

In connection with this case we quote another, communicated to us many months since by Dr. S. E. McKinley, of St. Louis:

The patient was a confirmed epileptic, and belonged to the Twenty-sixth Regiment Massachusetts Volunteers. While stationed at New Orleans the operation of orchotomy was performed, and no fits occurred afterward. Before the operation his weight was 134 lbs.; three months afterward he had gained 26 lbs.; four months after the operation he had gained 34 lbs.; and in five months 37, making his weight 171 lbs. He seemed at this period to have attained the augmented size and weight to which the operation destined him, for no perceptible increase took place afterward. He was cheerful, happy, and contented, and, being promoted to a sergeancy from the ranks, indicated no loss of intelligence or mental force. He was twenty-four years old, a mechanic, and had practiced self-abuse from the age of sixteen. The testicles were very small, his thighs and legs attenuated, skin rough, voice husky, eyes lustreless, and breath intolerable. Epilepsy "took" him one year after he commenced masturbation.

Adulterations in Drugs.—Mr. Charles R. C. Tichborne, writing to the *Medical Press and Circular*, says:

As illustrating the difficulty of detecting, and the inferiority of the drugs occasionally placed upon the market, I will give a few instances of my own experience—all of which came under my observation in one fortnight. I may mention that the samples analyzed were examined for the purpose of buying.

Of three samples of pale bark examined in one day, the handsomest in appearance was the worst. It was in long pieces fully twelve or fourteen inches in length, and covered with lichens. It had a gray and wrinkled surface, but was thin in substance (*an indication of a young bark*), and was wanting in transverse markings. It was, in fact, although a handsome specimen, perfectly worthless, for it did not contain one particle of quinia.

Another case was a specimen of glycerine offered for sale from sample by a broker, who, I will do him the justice to say, did not know any thing about its quality. This was, apparently, a pure and nice-looking glycerine; it agreed in every respect with the characteristics given in the "Pharmacopœia," and was even miscible with a solution of nitrate of silver; it would, therefore, from a casual observation, have been pronounced a pure specimen. As it was one-quarter cheaper than the market price of that quality of glycerine, it was examined

further, and found to contain fifteen per cent. of glucose or grape-sugar (estimated by the potassio-cupric tartrate)—the glucose having been procured from starch or sawdust. A solution with the gravity of glycerine might be procured for about a shilling per gallon, while the finest quality of glycerine is worth more than double that price per pound.

Another instance was that of a sample of lime-juice, which, when tried with the volumetric test of the "Pharmacopœia," gave the requisite degree of acidity, and therefore would appear, at first sight, to contain the needful quantity of citric acid. It proved to be a dilute lime-juice, brought up to the requisite degree of acidity by the addition of acetic acid. A novice in the *art* of adulterating would have used oil of vitriol as being the cheapest acidifier, but not so here. The expert cracksman does not use a coarse crowbar.

The editor of the *Medical Gazette*, of this city, in a very pertinent and opportune article on the dangers from the use of hydrate of chloral, collates five cases of death that have recently occurred from the ingestion of this drug. To these may now be added a sixth reported in the *Lancet*, of March 25, 1871. In this instance, thirty grains were administered in a single dose. Another case of a fatal result from the use of chloral is recorded in the Louisville *Courier-Journal* of the 29th of March.

The Executive Committee of the Alumni Association of the Medical Department of the University of the City of New York purpose the publication, at the earliest possible date, of a complete catalogue of the graduates from that institution since its foundation. The records of the Faculty having been destroyed in the burning of the college building some years ago, this project is one that should be seconded by every one of the alumni, of whom between two and three thousand are scattered throughout the United States. It is earnestly requested that each of these will, without delay, forward for enrolment his full name and post-office address, with his professional history, including date of graduation, posts of honor and trust held, etc., and also any information which he may possess concerning former class-mates who have since died or retired from practice. Communications should be addressed to the Secretary, Charles Inslee Pardee, M. D., 72 West Thirty-fifth Street, New York.

THE LATE PROF. VON NIEMEYER, M. D.

From a recent Photograph.

NEW YORK

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Original Communications.

ART. I.—*On the Physiological Effects of Severe and Protracted Muscular Exercise; with especial Reference to the Influence of Exercise upon the Excretion of Nitrogen.* By AUSTIN FLINT, Jr., M. D., Professor of Physiology in the Bellevue Hospital Medical College, New York, etc., etc.

The Chemical Analyses were made under the direction of R. O. DOREMUS, M. D., Professor of Chemistry and Toxicology in the Bellevue Hospital Medical College, etc., etc., by Mr. OSCAR LOEW, Assistant to Prof. Doremus.

The Observations were made with the coöperation of J. C. DALTON, M. D., Professor of Physiology in the College of Physicians and Surgeons; and ALEXANDER B. MOTT, M. D., Professor of Surgical Anatomy; W. H. VAN BUREN, M. D., Professor of Principles of Surgery, etc.; AUSTIN FLINT, M. D., Professor of the Principles and Practice of Medicine; W. A. HAMMOND, M. D., Professor of Diseases of the Mind and Nervous System—all of the Bellevue Hospital Medical College.

PART I.

IN May, 1870, I had an opportunity of examining the entire urine passed by Mr. Edward Payson Weston, the celebrated pedestrian, during the time occupied in accomplishing the extraordinary feat of walking one hundred miles in twenty-one hours and thirty-nine minutes. The urine on that occasion was accidentally passed into a single vessel, and had been un-

disturbed until it came into my possession. I had no means of obtaining any reliable scientific information with regard to the amount and character of the food taken during that time, nor had I obtained, for purposes of comparison, a specimen of the urine passed on the day before this remarkable muscular effort. It was several weeks, indeed, before I could get the urine of twenty-four hours of comparative repose; which I was forced to take as representing about the normal excretion. I simply took the material for scientific analysis as I could best obtain it, and published the results, with a statement of the facts, not at that time entertaining any definite hope of being able to repeat the investigations under more favorable conditions. I was, of course, well aware of the necessity of carefully estimating certain elements of the food, and of connecting the elimination of effete matters, particularly those containing nitrogen, with the matters ingested. Had I been sure of an opportunity of studying the effects upon excretion of excessive and prolonged muscular exertion, such as has since presented itself, my first experiments, of the unavoidable defects of which no one could be more sensible than myself, would never have been published. My first observations have been excluded in the present inquiry, on account of the imperfect data on which they were based; but I may anticipate my conclusions from these more complete experiments enough to state that the results have been essentially the same as those first obtained.

In the summer of 1870, Mr. Weston proposed to make an attempt to walk four hundred miles in five consecutive days, and, upon one of those days, to walk one hundred and twelve miles in twenty-four consecutive hours. He kindly offered to submit himself to any scientific observations that I might wish to undertake in connection with this effort. It is hardly necessary to say that this offer was gladly accepted; and I regarded it as a sacred duty to use every endeavor to make this occasion to the fullest extent useful to physiological science. The investigations to be made seemed to me of such importance, particularly in the present unsettled state of physiological opinion upon certain points connected with nutrition and disassimilation, that I asked the aid of certain of my friends, well known for their

scientific attainments, in projecting and carrying out a series of experiments which should be as complete as possible.

The following gentlemen consented to lend to the proposed work the advantage of their scientific experience and judgment: Dr. R. Ogden Doremus, Professor of Chemistry in the Bellevue Hospital Medical College and the College of the City of New York; Dr. J. C. Dalton, Professor of Physiology in the College of Physicians and Surgeons; and Dr. W. H. Van Buren, Professor of the Principles of Surgery, etc.; Dr. Austin Flint, Professor of the Principles and Practice of Medicine; Dr. W. A. Hammond, Professor of Diseases of the Mind and Nervous System; and Dr. Alexander B. Mott, Professor of Surgical Anatomy—all of the Bellevue Hospital Medical College. Prof. Hammond, among his earliest contributions to science, made observations on the influence of exercise upon the elimination of urea, which have been fully confirmed by our researches in the present instance.[1]

At a meeting held some weeks before the walk, a definite plan of investigations was agreed upon. Prof. Doremus assumed the responsibility of all of the necessary chemical analyses, and I proposed to take charge myself of the remaining scientific work, and to superintend the records of diet, etc. The plan of operations agreed upon will be fully detailed further on, as an introduction to an account of our observations; but this may be anticipated at the outset by a few general statements.

It was proposed to make our observations for three distinct periods, viz.; first period, five days before the walk; second period, the five days of the walk; third period, five days after the walk. For the fifteen days during which Mr. Weston was to be under observation, it was proposed to have a trusty assistant with him every instant, day and night, who was to weigh his food and drink and make notes under the direction of one of our number. This was done by Mr. Thomas C. Doremus, Jr., who performed his arduous task in the most faithful and accurate manner. The urine and fæces were sent to the labora-

[1] HAMMOND, *The Relations existing between Urea and Uric Acid.—Physiological Memoirs*, Philadelphia, 1863, p. 9; from the *American Journal of the Medical Sciences*, January, 1855.

tory of Prof. Doremus, where they were analyzed under his direction by his able assistant, Mr. Oscar Loew. The results show the value of the immense amount of labor bestowed by Mr. Loew upon these analyses; a labor undertaken and carried out with a scientific enthusiasm which has added much to the value of our results. The necessary analyses of food were also made by Mr. Loew.

The material thus collected, with a complete record of the walk, finally passed into my hands for classification and analysis. Before a word of this report was written, the tables of food, composition of urine, fæces, etc., were calculated. This alone has been a labor of several weeks, and no pains has been spared to secure entire accuracy. The numerical calculations were all made by two or more different methods, so that it has seemed almost impossible that any error of importance should have been overlooked. Taking, as I have, the bare records and analyses made by Mr. Doremus and Mr. Loew, with entire ignorance of their probable results, the calculations proceeded steadily to their mathematical conclusions, which were only apparent at their actual completion.

In the preparation of this paper, I have attempted to present the scientific data in such a form as to be easily available as ascertained facts, to any who may not admit the interpretation I have put upon them.

It may serve to make the bearing of our observations more easily comprehended to give a succinct statement of the generally-received physiological views regarding certain of the points involved. In this I do not propose to analyze the literature of the subject, even for the past few years; and I desire especially to avoid controversial discussion. I do not intend to criticise the experiments of others or to point out their defects, except in so far as these defects may seem to be supplied by my more extended opportunities for investigations in particular directions.

Views of Physiologists with regard to the Influence of Exercise, Diet, etc., upon the Elimination of Nitrogenized Excrementitious Matters, chiefly Urea.

Following the brilliant researches of Lavoisier upon the chemical phenomena of respiration and their relations to

animal heat, the theories of Liebig, who divided the food into two classes, plastic and calorific, were almost universally adopted by physiologists. Liebig advanced the view that those articles of food composed of carbon, hydrogen, and oxygen, were chiefly, if not entirely, useful in maintaining the animal temperature, by entering into combination with the oxygen of the inspired air, producing carbonic acid, water, and heat. He regarded the elements of food composed of carbon, hydrogen, oxygen, and nitrogen, as concerned chiefly, if not entirely, in repairing the waste of the nitrogenized portions of the living body, particularly the muscular tissue. Applying these views to muscular action, Liebig assumed that exercise was always attended with an increased activity in the destructive metamorphosis of the nitrogenized substance of the muscular tissue; and that this could be measured by the amount of urea excreted. The following quotation from one of his earlier works embraces the whole question:

"Boiled and roasted flesh is converted at once into blood; while the uric acid and urea are derived from the metamorphosed tissues. The quantity of these products increases with the rapidity of transformation in a given time, but bears no proportion to the amount of food taken in the same period. In a starving man, who is any way compelled to undergo severe and continued exertion, more urea is secreted than in the most highly-fed individual if in a state of rest."[1]

Again, Liebig makes the general statement that "the amount of tissue metamorphosis in a given time may be measured by the quantity of nitrogen in the urine."[2]

For many years, this view of the source of the nitrogenized excrementitious principles and the laws which regulate the activity of their production was received by physiologists almost without question. It was modified, however, a few years later, by the researches of Lehmann, who showed by a large number of observations on his own person that, other conditions being equal, the character and quantity of food modified very greatly

[1] LIEBIG, *Animal Chemistry, or Chemistry in its Applications to Physiology and Pathology*, London, 1843, p. 138.

[2] Ibid., p. 245.

the elimination of urea, as is seen by the following quotation:

"My experiments show that the amount of urea which is excreted is extremely dependent on the nature of the food which has been previously taken. On a purely animal diet, or on food very rich in nitrogen, there were often two-fifths more urea excreted than on a mixed diet; while, on a mixed diet, there was almost one-third more than on a purely vegetable diet; while, finally, on a non-nitrogenous diet, the amount of urea was less than half the quantity excreted during an ordinary mixed diet."[1] Lehmann further states, however, that, upon a uniform diet, the elimination of urea is increased by muscular exercise.

The views of Liebig, modified by the researches of Lehmann, were pretty generally accepted, up to 1866; notwithstanding that Bischoff had advanced experiments to prove that the elimination of nitrogen by the kidneys was regulated almost entirely by the amount of nitrogen in the ingesta.[2]

In 1866, Fick and Wislicenus published an account of experiments made in ascending one of the Alpine peaks, the Faulhorn, about 6,500 feet high. These experiments were undertaken with the view of showing that severe and prolonged muscular effort could be accomplished upon a non-nitrogenous diet. The two experimenters took no albuminoid food from mid-day on August 29th until seven P. M. of August 30th. The experiments proper began on the evening of the 29th, at a quarter-past six P. M., by a complete evacuation of the bladder. The urine from this time till ten minutes past five on the morning of the 30th (about eleven hours) was collected, and called the "night-urine." The ascent began at ten minutes past five and occupied eight hours and ten minutes. The urine passed during this period was collected as "work-urine." The urine for five hours and forty minutes after the ascent was

[1] LEHMANN, *Physiological Chemistry*, Philadelphia, 1855, vol. i., p. 150.

[2] BISCHOFF, *Der Harnstoff als Maas des Stoffwechsels*, Giessen, 1853. In 1860, these researches were considerably extended by Bischoff and Voit. BISCHOFF UND VOIT, *Die Gesetze der Ernährung des Fleischfressers*, Leipzig und Heidelberg, 1860.

collected as "after-work urine." The urine from seven P. M., August 30th, till half-past five A. M., August 31st, was collected and designated as "night-urine." The results of the examinations of these specimens in the two persons were nearly identical. The following is the estimate of the elimination of nitrogen per hour during the different periods:[1]

	Fick.	Wislicenus.
During the night, 29th to 30th	0.63 grammes.	0.61 grammes.
During the time of work	0.41 "	0.39 "
During rest after work	0.40 "	0.40 "
During the night, 30th to 31st	0.45 "	0.51 "

From these results, Fick and Wislicenus conclude that muscular exercise does not necessarily increase the elimination of nitrogen; that the substance of the muscle itself is consumed in insignificant quantity; and that the muscular system is a machine, consuming, in its work, not its own substance, but fuel, which is supplied by the food. The most efficient fuel Fick and Wislicenus consider to be non-nitrogenized food; the results of its consumption being force, or work, heat and carbonic acid. They adopt the view "that the substances, by the burning of which force is generated in the muscles, are not the albuminous constituents of the tissues, but non-nitrogenous substances, either as fats or hydrates of carbon."

"We might express this doctrine by the following simile: A bundle of muscle-fibres is a kind of machine consisting of albuminous material, just as a steam-engine is made of steel, iron, brass, etc. Now, as in the steam-engine coal is burnt in order to produce force, so, in the muscular machine, fats or hydrates of carbon are burnt for the same purpose. And in the same manner as the constructive material of the steam-engine (iron, etc.) is worn away and oxidized, the constructive material of the muscle is worn away, and this wearing away is the source of the nitrogenous constituents of the urine. This theory explains why, during muscular exertion, the excretion of the nitrogenous constituents of the urine is little or not all increased, while that of the carbonic acid is enormously aug-

[1] FICK AND WISLICENUS, *On the Origin of Muscular Power.—London, Edinburgh and Dublin Philosophical Magazine*, London, January–June, 1866, vol. xxxi., p. 492.

mented; for, in a steam-engine, moderately fired and ready for use, the oxidation of iron, etc., would go on tolerably equably, and would not be much increased by the more rapid firing necessary for working, but much more coal would be burnt when it was at work than when it was standing idle."[1]

I have made the above quotations from the paper of Fick and Wislicenus, for the reason that the theories therein advanced and the experiments reported have changed very materially the current of physiological opinion with regard to the origin of muscular force and the significance of the elimination of nitrogen. The question is not materially modified or advanced by the papers of Frankland[2] or of Haughton,[3] who sustain fully the views of Fick and Wislicenus, which are now adopted very largely, particularly in Germany and England.

The opposite view, that the elimination of nitrogen is to a great extent a measure of the waste of the nitrogenized elements of the tissues, and that this is increased by exercise, is substantially the one advanced by Liebig. Almost all observers who have experimented upon the influence of exercise upon the elimination of urea, under an ordinary diet, have found its excretion markedly increased. Among the earliest of these are the observations of Hammond, to which reference has already been made. In 1867, experiments were made by Parkes upon two soldiers, with the view of controlling the experiments of Fick and Wislicenus by observations upon a more extended scale.[4] These experiments failed to confirm those of Fick and Wislicenus. They were continued for a period of eighteen days, and certainly seemed to show an increase in the urea, attributable to muscular exercise. The extraordinary exercise taken was a walk of 23.70 miles on one

[1] *Loc. cit.*, p. 501.

[2] Frankland, *On the Origin of Muscular Power.—London, Edinburgh and Dublin Philosophical Magazine*, London, July—December, 1866, vol. xxxii., p. 182, *et seq.*

[3] Haughton, *Address on the Relation of Food to Work done by the Body, and its Bearing upon Medical Practice.—The Lancet*, London, August 15, August 22, and August 29, 1868.

[4] Parkes, *On the Elimination of Nitrogen by the Kidneys and Intestines, during Rest and Exercise, on a Diet without Nitrogen.—Proceedings of the Royal Society*, London, 1867, vol. xv., No. 89, p. 339, *et seq.*

day, and 32.78 miles on the day following. During these two days, on an exclusively non-nitrogenized diet, the elimination of nitrogen was slightly increased over a period of two days of rest and non-nitrogenized diet. In an analysis of a recent course of lectures delivered by Dr. Parkes, at the College of Physicians, London, it appears that he is disposed to take a view of the subject between the two extremes, viz.; that the muscular system is able to accomplish work by the consumption of non-nitrogenous food; that exercise does, however, slightly increase the elimination of urea, and that during exercise a small portion of the muscular substance is consumed; but he holds that the variations in the quantity of nitrogen eliminated are almost entirely dependent upon the amount of nitrogen contained in the food.[1]

One desirous of consulting further the literature of this interesting question will find, in a recent article by Liebig, a full discussion of the subject of the source of muscular power from his own point of view.[2] He analyzes very fully the experiments of Parkes, and finds in the results fresh testimony in favor of his view, that the increase in the elimination of nitrogen as a consequence of muscular exercise is not limited to the period of exertion, but continues for some time after. On the other hand, Voit has lately published a most elaborate paper reviewing the publications on this question that have appeared for the last twenty-five years.[3] Neither of these papers adds to the sum of physiological knowledge by the contribution of new experimental facts; but they are interesting, as expressing the arguments upon two opposite sides, and they illustrate the necessity of new observations, in which some of the important omissions in the experiments hitherto made may be supplied.

[1] *Abstract of the Croonian Lectures delivered at the College of Physicians by Dr. Parkes.—Medical Times and Gazette*, London, March 15, 1871, p. 348.

[2] LIEBIG, *The Source of Muscular Power.—The Pharmaceutical Journal and Transactions*, London, 1870, Third Series, part ii., p. 161, and part iii., pp. 181, 201, 221.

[3] VOIT, *Ueber die Entwicklung der Lehre von der Quelle der Muskelkraft und einiger Theile der Ernährung seit 25 Jahren.—Zeitschrift für Biologie*, München, 1870, Bd. vi., S. 305, *et seq.*

Plan of the Investigations and the Processes employed.

A few weeks before Mr. Weston put himself under our observation, he was made to undergo a thorough physical examination at the hands of Prof. Austin Flint, and his urine was examined by myself. The result showed that Mr. Weston was in perfect health, at least as far as could be determined by any ordinary physical examination. This examination was made in order to ascertain whether or not there existed any physical reason why it would be unsafe for Mr. Weston to undertake his proposed task.

Having ascertained that Mr. Weston was in perfect health, he was invited to be present at a meeting of scientific gentlemen, for the purpose of fixing upon a definite plan of investigation. At this meeting were present, Profs. Doremus, Dalton, Van Buren, Flint, Hammond, and myself. Prof. Mott, who rendered us most valuable assistance during the walk, was not present at that meeting. Mr. Weston was here subjected to another examination with regard to his physical condition, which was found to be perfect.

As the result of our deliberations at this meeting, it was decided to confine our investigations within limits that would render it possible to complete them accurately and satisfactorily; the fear being that, in attempting to do too much, the value of our results might be impaired. It was also deemed proper to take the position that we would under no circumstances interfere with Mr. Weston's diet, training, or manner of making the walk, simply observing the facts according to our plan. This idea was fully carried out. Throughout the entire fifteen days during which Mr. Weston was under observation, he acted in every thing according to his own judgment; and the walk was made without any advice or interference on the part of any of the scientific gentlemen engaged in the investigations.

In collecting our material, it was determined to note the following points:

1. To take our observations during three periods, viz.; a first period, five days before the walk; the second, the five days of the walk; and the third, five days after the walk. Inasmuch as we proposed to assume the entire responsibility

of the accuracy of all the facts noted, it was determined to place Mr. Weston in the hands of Mr. Thomas C. Doremus, Jr., son of Prof. Doremus, who was not to leave him, night or day, without notifying the one in charge of the investigations. This was done. Mr. Doremus was actually with Mr. Weston, night and day, for the fifteen days, except on two occasions. On one day, for a few hours, Mr. Doremus' place was supplied by Mr. Loew, assistant to Prof. Doremus, who was engaged in making the chemical analyses. On another occasion, Mr. Doremus was relieved by myself for about four hours. During the walk, Prof. Mott, Prof. Doremus, and myself, one or all of us, were constantly present at the rink. Mr. Doremus was with Mr. Weston almost constantly at this time, but he occasionally slept in the building, when Mr. Weston was walking at night, leaving him in charge of one of us. It is necessary to make these statements, in view of the extraordinary character of our results, to show that nothing is taken as a fact to work upon, unless observed by ourselves or our assistants. I desire again to commend the fidelity with which Mr. Doremus executed that part of our plan intrusted to him, though, as is evident, it involved an immense amount of fatigue.

2. To take every day, as nearly as possible at the same hour and under the same conditions, the naked weight, pulse, respirations, and temperature.

3. To note accurately the weight of every separate article taken as food or drink. This was done for two purposes: to note the ingesta and excreta, with reference to the weight of the body; and to have all the articles of food separately weighed, so as to estimate the daily consumption of nitrogen.

4. To note the amount of exercise taken each day, in the first period, before the walk, and in the third period after the walk, and also to note any thing unusual with reference to his general condition.

5. To collect the entire urine of the twenty-four hours, day by day, for the purpose of subjecting it to chemical and microscopical examination. As Mr. Weston proposed to arrange in his walk of five days that the time should expire a few minutes after midnight, the twenty-four hours for collect-

ing the urine were calculated from midnight to midnight. It was also determined to collect and weigh the fæces.

In the execution of the above plan, I assumed the responsibility of superintending the records, except the notes of the chemical analyses, and of making microscopical examinations of the urinary sediments. Prof. Doremus assumed the responsibility of the chemical analyses. As far as the general records are concerned, I have no hesitation in testifying to their entire accuracy. It is fortunate that no accident happened, such as the breaking of a bottle or a glass, and the only error was in taking the weight on November 23d, the third day of the walk. Prof. Doremus is equally satisfied with regard to the chemical analyses, made by his assistant, Mr. Oscar Loew.

The details of the plan as it was carried out are as follows:

Mr. Doremus, Mr. Loew, and myself, were each provided with a note-book. My own note-book was for recording the microscopical examinations of the urinary sediments.

The following directions were written in the note-book given to Mr. Doremus :

At every meal, weigh the food and drink in the following manner :

Put the meat on a separate plate, and weigh the plate before and after eating. Note the loss of weight, which will give the quantity actually consumed. Mr. Weston does not intend to eat much fat, but expects to get his fat from butter. When he eats fat it is to be noted.

Put each vegetable on a separate plate and determine the quantity consumed, in the same way as for the meat.

Estimate the bread in the same way as the meat and vegetables.

Take a known weight of butter and weigh each night to ascertain the quantity taken during the day. It will be sufficient to determine in this way the quantity of butter consumed in the twenty-four hours.

Estimate the quantity of sugar taken, in the same way as the butter.

Note the number of eggs taken, and see that they are entirely consumed.

Measure the water taken, by fluidounces, and always carry a graduated glass for Mr. Weston to drink from, so that the amount shall be estimated exactly.

Measure the coffee, tea, and any other liquids taken, in the same way, and note especially the quantity of milk used.

Each night, just before Mr. Weston goes to bed, take the weight of the body, naked, the temperature under the tongue, the pulse and respirations, and note the time when the above-mentioned conditions are taken. The pulse is always to be counted sitting. The respirations are to be taken in the same position, when Mr. Weston's attention is diverted and when he is perfectly tranquil.

Note the exercise, miles walked, time, etc., for each twenty-four hours.

Collect all the urine for each twenty-four hours. Send six fluidounces to me for microscopical examination, and send the remainder to the chemical laboratory for quantitative analysis. Before any of the urine is sent, mix the whole for the twenty-four hours, and note on the bottle sent to the chemical laboratory the amount taken out for microscopical examination, so that the chemist may take that into account in his record of the entire quantity.

Collect the fæces and send them each day to the chemical laboratory.

At the end of each record for the day, note the general condition of health and feelings and any unusual circumstance that may have occurred during the day affecting the physiological conditions.

Note each fact instantly, leaving nothing to the memory. Read these directions carefully every night before closing the record for the day, and supply at once any omissions.

The following directions were written in the note-book given to Mr. Loew:

Measure the entire quantity of urine in the twenty-four hours.

Note the odor, color, reaction, and specific gravity.

Note the presence or absence of albumen and sugar.

Ascertain the proportions of various constituents of the urine, according to directions received from Prof. Doremus.

Be exceedingly careful to note each day accurately from midnight to midnight.

The weight was taken each night, generally in my presence, by Mr. Doremus, as near midnight as practicable, upon new platform-scales, weighing accurately to a quarter of a pound, kindly furnished by Messrs. Fairbanks & Co., of New York. The food was weighed upon a new balance, likewise furnished by Messrs. Fairbanks & Co., weighing accurately to $\frac{1}{64}$ of an ounce. These balances were selected on account of the well-known accuracy of the makers, and for their availability for rapid weighing, inasmuch as it was desirable to annoy Mr. Weston as little as possible, particularly in giving him his weighed food. The pulse, respirations, and temperature, were noted by myself, except on the evening of November 16th, when they were noted by Prof. Dalton. The temperature was taken under the tongue with a maximum thermometer, "Celsius, Berlin," graduated to $\frac{1}{10}$ of a degree, Centigrade.

The weight of the food was taken in the manner indicated. The liquids were measured in a graduated glass, as a matter of convenience; but their actual weight was calculated in the final tables.

Having taken the actual weight of each article of food, it was desired to ascertain the amount of nitrogen in the ingesta. After consulting carefully all the works at my command giving analyses of the different articles of food, I compiled the following table from the admirable treatise on alimentation, by Payen. It was at first thought desirable to subject specimens of each article to ultimate analysis for nitrogen; but the conditions under which the observations were carried out seemed to render the estimates of Payen even more useful. It was assumed at the outset that we were not to interfere with the diet in any way, noting only the articles taken. Mr. Weston's food was taken at several different places, and was prepared by different persons; and it would have been impossible to have analyzed actual specimens of each article. In view of this fact, it seemed probable that the variations from our analyses, should we have made them, would have been as considerable as the variations from the average estimates given by Payen. It has been ascertained, also, that

the flesh of different animals presents but a small fraction of a percentage of difference in the nitrogen. All the meats, therefore, are classed together in the table, and are assimilated to the composition of cooked beef, which contains about 3.5 per cent. of nitrogen.[1] No estimate could be found of the proportion of nitrogen in the beef-essence, head-cheese, or oatmeal-gruel; and these articles were analyzed for nitrogen by Mr. Oscar Loew, by the ordinary method, viz.; treating the dry residue after evaporation with soda-lime, and determining the nitrogen as ammonio-chloride of platinum, reducing the metallic platinum by heat. The estimates of the proportion of nitrogen in the food were therefore approximative; but the percentage that might properly be allowed for error would be very slight. Even if this should be taken at the almost impossible figure of ten per cent., it would not modify the results. The advantage of experimenting upon a normal and unrestricted diet seems to me to more than compensate for the necessarily approximative estimates of the amount of nitrogen consumed.

Proportions of Nitrogen per Hundred Parts.

ARTICLE.	NITROGEN.	AUTHORITY.
Beef, Mutton, Chicken, Turkey, Fish	3.50	Payen, p. 488. This is the approximative estimate for cooked beef.
Eggs	1.90	Payen, p. 488.
Beef-essence	0.87	O. Loew (actual analysis).
Head-cheese	2.24	do. do.
Milk	0.66	Payen, p. 488.
Custard	1.28	Average of milk and eggs.
Ice-cream	1.28	do. do.
Cream-cakes	1.28	do. do.
Oysters	2.13	Payen, p. 489.
Cheese	4.12	do. do.
Bread (includes corn-cakes, cake, crackers, and bread-pudding)	1.08	Payen, p. 490.
Rice-pudding (rice and custard)	1.18	do. do.; Rice, p. 108.
Oatmeal-gruel	0.086	O. Loew (actual analysis).

[1] PAYEN, *Précis theorique et pratique des substances alimentaires*, Paris, 1865, p. 488, *et seq.*

Article.	Nitrogen.	Authority.
Potatoes	0.33	Payen, p. 490.
Figs	0.92	do. do.
Butter	0.64	do. do.
Coffee	0.11	do. do.
Tea	0.02	do. do.
Tomatoes Cranberries Cauliflower Celery Lettuce Tomato-soup Tomato-catsup Grapes Apples Citron Preserves Sweet pickles Sugar Lemonade Molasses-and-water Vinegar Salt Pepper Bicarbonate of potash	These articles contain no nitrogen, or merely a trace which may be disregarded.	

The urine of each twenty-four hours was carefully collected in a large, glass-stoppered bottle, and was analyzed by Mr. Loew, by the following methods:

The specific gravity was always determined by actual weight.

The urea was estimated by Liebig's volumetric process. In this, a single specimen of urine was used for estimating both chloride of sodium and urea. The chloride of sodium was determined first, and afterward the urea was determined with a different mercurial solution. This was done to avoid confusion and possible mistake in the readings of the burettes.

The uric acid was determined by weight; concentrating the urine, treating it for twelve hours with nitric acid, and collecting the crystals of uric acid.

The phosphoric acid was determined by weight, converting the phosphates into $2MgO,PO_5$.

The sulphuric acid was determined by weight, converting the sulphates into BaO,SO_3.

The examination of the urinary sediments was made by myself with a $\frac{1}{5}$ inch objective, allowing the specimen to stand about twelve hours.

The fæces were passed directly into clean glass vessels provided with air-tight glass covers, and weighed. The nitrogen of the fæces was estimated by the soda-lime and platinum process.

Physiological History of Mr. Weston for the Fifteen Days during which he was under Observation.

The fifteen days during which Mr. Weston was under observation were divided into three periods of five days each. During the first period of five days, he took very moderate exercise, and assumed to be "training" for the walk, though he did not pursue the system generally adopted in training for efforts of endurance. The second period embraces the five days of the walk. The third period of five days after the walk was one of almost absolute rest. During the entire fifteen days, he abstained altogether from alcoholic beverages. Though not what is called a total abstainer, Mr. Weston is not an habitual drinker. He occasionally takes a glass of ale or wine, but this is rare. During the first two periods, Mr. Weston did not smoke. He smoked from five to seven cigars daily during the third period of five days. In the records of food taken, the time of eating is stated, but I have not thought it necessary to extend the tables by giving a separate account of each meal, and shall generally give in a single table the entire quantity consumed in the twenty-four hours.

At the time of making the walk, Mr. Weston was thirty-one years and eight months old. His height is five feet and seven inches. His weight, naked, is from one hundred and twenty to one hundred and twenty-five pounds. He has never had any serious illness, with the exception of what he describes as vertigo and rather serious brain-symptoms after attempting a walk when he was suffering from a cold and headache. This occurred in the summer of 1870. He does not know that he has any hereditary tendency to disease. His physical confor-

mation is interesting, in view of his immense powers of endurance.

His general build is slight, and the parts above the waist are very light. The bones of the chest and upper extremities are small, and the muscles are but little developed. The pelvis is unusually broad for a male, and the lower extremities are so formed that there is a considerable space between the thighs from the knees to the perinæum. This conformation is peculiarly fortunate, as it gives immunity from chafing, which is one of the greatest sources of annoyance to pedestrians. The lower extremities are remarkable for the unusual development of the muscles that move the thighs upon the pelvis. In walking, it is observed that Mr. Weston makes great use of these muscles, and uses the muscles of the leg very little. The calf of the leg is small; much smaller than one would expect to see in a pedestrian.

A noticeable peculiarity about the muscles of the thighs and legs is that they never become hard, or what is technically called "fine." They were quite soft before the walk, and at all times during the walk they were in the same condition. It was very remarkable that, after the third day, when Mr. Weston had walked within the twenty-four hours ninety-two miles, the muscles were as soft as ever. It has seemed to me that this peculiarity of the muscles is advantageous. When the muscles are very hard from thorough training, prolonged exertion is apt to produce cramps, due, perhaps, to exaggeration of the normal muscular irritability. This is also a difficulty experienced by pedestrians. In the case of Mr. Weston, the movements were always free, and, according to his statements, he was never much fatigued. Only once during the five days of the walk did he say that he was "leg-weary." What he complained of most was want of sleep, and, at one time, vertigo. The conformation of the feet is perfect; the toes are straight, the instep is high, and the heel is very long, giving a remarkable leverage for the tendo Achillis. The heel does not project, as in the negro, but the tendo Achillis passes straight to the calf of the leg.

The nervous element has seemed to me very important in the tasks accomplished by Mr. Weston. In walking, his pluck

is extraordinary. On the fourth day of the walk, having made on the first day, eighty miles, on the second, forty-eight miles, and on the third, ninety-two miles, he kept on the track after having walked over fifty miles, until his vertigo became so great that he could not see to turn the corners. He was forced from this cause to abandon all hope of making four hundred miles in five days; but on the fifth day, he appeared again at 10 A. M., and walked over forty miles. While walking, however, Mr. Weston was excessively sensitive, and was disturbed and annoyed by the slightest things. I am confident that he could accomplish more if he were properly prepared by training, and were cared for during his walks by a competent professional trainer.

First Period, Five Days before the Walk.

At midnight, November 15th, the observations were begun. At forty minutes past twelve, his general condition was as follows:

Weight (naked)...............	120.5 lbs. (54k. 655 grammes).
Temperature under the tongue,.........	98.6° (37° C.)
Pulse (sitting and perfectly tranquil)..............	64.
Respirations.....................................	19.

Immediately after this examination, Mr. Weston went to bed.

November 16*th*, *First Day.*

Mr. Weston slept well during the night, and rose in good health and spirits at 8.15 A. M. He felt well the entire day; took his breakfast at 9.15 A. M.; dinner at 1.10 P. M.; and supper at 7.55 P. M. He walked during the day about fifteen miles. Though feeling well, he was worried and anxious about the business arrangements for his walk. He did not go to bed until 2.35 A. M., November 17th. He slept, during the twenty-four hours, seven hours and thirty minutes.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Beefsteak...........	12.25	187.58
Mutton-chops........	3.00	45.94
Eggs................	2.76	22.94
Milk................	7.21	20.82
Bread...............	9.88	47.48
Potatoes............	8.25	11.99
Butter..............	2.12	5.94
Sugar...............	1.78	00.00
Coffee..............	35.60	17.13
Tea.................	16.03	1.40
Water...............	24.00	00.00
Salt................	0.09	00.00
Pepper..............	0.02	00.00
	122.99	361.22
	(3,492.17 grammes.)	(23.404 grammes.)

Total ingesta......... (7 lbs., 10 $\frac{99}{100}$ oz.)
Liquids.............. (5 lbs., 2 $\frac{84}{100}$ oz.)

Analyses of Excretions of Twenty-four Hours.

URINE.

Quantity..............................	39.55 fl ℥ (1,170.0 c.c.)			
Specific gravity......................	1024.0			
Urea..................................	650.08	grains,	42.120	grammes.
Nitrogen in urea......................	303.37	"	19.656	"
Uric acid.............................	3.55	"	0.230	"
Phosphoric acid.......................	51.46	"	3.334	"
Sulphuric acid........................	38.37	"	2.486	"
Chloride of sodium....................	195.02	"	12.636	"

This urine presented a light flocculent sediment, which contained a large number of octahedra of the oxalate of lime.

FÆCES.

Quantity..............................	3.70 oz. av.	105.0	grammes.
Nitrogen..............................	19.89 grains,	1.289	"
Nitrogen in urea and fæces combined...	323.26 "	20.945	"

Nitrogen of urea and fæces per 100 parts of nitrogen of food..89.49 parts.
Uric acid per 100 parts of urea.......................... 0.538 "

10.30 P. M.
- Weight (naked)..........120.5 lbs. (54 k. 655 grammes.)
- Temperature under the tongue.......... 99.7° (37.° C.)
- Pulse, full and soft..................... 75.
- Respirations........................... 20.

November 17th, Second Day.

After going to bed at 2.35 A. M., Mr. Weston rose at 8.45 A. M., and said that he felt well, but had not slept long enough. He had a little headache in the middle of the day, which continued until evening. He took breakfast at 9.40 A. M.; dinner at 2.30 P. M.; and supper at 7.40 P. M. He walked during the day about five miles. He was still worried about his arrangements for the walk. He went to bed at 11.30 P. M. He slept, during the twenty-four hours, six hours and forty minutes.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Beefsteak	5.25	80.39
Roast beef	5.25	80.39
Eggs	4.14	34.41
Milk	4.63	13.37
Bread	8.50	40.16
Potatoes	10.00	14.44
Tomatoes (stewed)	7.00	00.00
Butter	2.95	8.26
Sugar	1.25	00.00
Coffee	32.32	15.53
Tea	16.03	1.40
Water	8.00	00.00
Salt	0.02	00.00
Pepper	0.09	00.00
	105.43	288.35
	(2,987.92 grammes.)	(18.682 grammes.)

Total ingesta......... (6 lbs., 9 $\frac{43}{100}$ oz.)
Liquids............. (3 lbs., 12 $\frac{98}{100}$ oz.)

Analyses of Excretions of Twenty-four Hours.

URINE.

Quantity	38.03 fl ℥ (1125.0 c.c.)			
Specific gravity	1024.4			
Urea	590.35	grains,	38.250	grammes.
Nitrogen in urea	275.50	"	16.517	"
Uric acid	4.03	"	0.261	"
Phosphoric acid	44.08	"	2.921	"
Sulphuric acid	40.92	"	2.651	"
Chloride of sodium	158.00	"	10.237	"

The sediment was the same as on November 16th, but the octahedra of the oxalate of lime were more numerous.

FÆCES.

Quantity	4.78 oz. av.	135.5 grammes.
Nitrogen	25.68 grains,	1.664 "

Nitrogen in urea and fæces combined	301.18 "	18.181 "

Nitrogen of urea and fæces per 100 parts of nitrogen of food. 104.45 parts.
Uric acid per 100 parts of urea.................. 0.683 "

11.20 P. M.	Weight (naked)	121.25 lbs. (55 kilos.)
	Temperature under the tongue	98.4° (36.9° C.)
	Pulse	73.
	Respirations	20.

November 18*th*, *Third Day.*

Mr. Weston rose at 9 A. M.; took his breakfast at 9.50 A. M.; dinner at 2.15 A. M.; and supper at 7.35 P. M. He said he felt "splendidly" all day. He wrote about seven hours, and walked about five miles. He was very cheerful all day, and went to bed at 12.20 A. M., November 19th. He slept, during the twenty-four hours, nine hours.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Beefsteak	10.37	158.79
Eggs	2.76	22.94
Milk	7.21	20.82
Bread	7.75	36.62
Potatoes	5.13	7.41
Butter	3.13	8.76
Sugar	1.75	00.00
Coffee	32.32	15.53
Tea	16.03	1.40
Salt	0.09	00.00
Pepper	0.02	00.00
	86.56	272.27
	(2,453.67 grammes.)	(17.641 grammes.)

Total ingesta.......... (5 lbs., 6 $\frac{56}{100}$ oz.)
Liquids............... (3 lbs., 7 $\frac{56}{100}$ oz.)

Analyses of Excretions of Twenty-four Hours.

URINE.

Quantity	46.15 fl ℥ (1,365.0 c.c.)			
Specific gravity	1023.1			
Urea	653.08	grains,	42.315	grammes.
Nitrogen in urea	304.77	"	19.747	"
Uric acid	0.94	"	0.061	"
Phosphoric acid	45.14	"	2.925	"
Sulphuric acid	38.86	"	2.518	"
Chloride of sodium	191.70	"	12.421	"

There was a rather light, cloudy sediment, which contained a little mucus, and a very few small octahedra of the oxalate of lime.

FÆCES.

Quantity	4.76 oz. av.	135.0	grammes.
Nitrogen	25.59 grains,	1.658	"
Nitrogen in urea and fæces combined	330.36 "	21.405	"

Nitrogen of urea and fæces per 100 parts of nitrogen of food . . 121.30 parts.
Uric acid per 100 parts of urea . . . 0.144 "

11.55 P. M.	Weight (naked)	120 lbs. (54 k. 432 grammes.)
	Temperature under the tongue	98° (36.7° C.)
	Pulse	71.
	Respirations	20.

November 19th, Fourth Day.

Mr. Weston rose at 8.35 A. M., feeling as well as possible; took breakfast at 9 A. M.; dinner at 4.45 P. M.; and supper at 10.45 P. M. He said he felt "splendidly" all day. He walked during the day about fifteen miles, was very cheerful, and went to bed at 12.45 A. M., November 20th. He slept, during the twenty-four hours, seven hours and fifteen minutes.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Beefsteak	4.25	65.08
Mutton-chops	4.88	74.72
Roast beef	4.88	74.72
Eggs	4.14	34.41
Milk	4.38	12.65
Bread	10.25	48.43

	Oz. Av.	Nitrogen, in grains.
Potatoes	0.88	1.27
Butter	2.43	6.80
Sugar	1.61	00.00
Coffee	32.32	15.53
Tea	16.03	1.40
Salt	0.09	00.00
Pepper	0.05	00.00
	86.19	335.01
	(2,443.19 grammes.)	(21.706 grammes.)

Total ingesta........... (5 lbs., $6\frac{19}{100}$ oz.)
Liquids................ (4 lbs., $4\frac{73}{100}$ oz.)

Analyses of Excretions of Twenty-four Hours.

URINE.

Quantity	32.45 fl ℥		(960.0 c.c.)	
Specific gravity	1027.6.			
Urea	607.55	grains,	39.365	grammes.
Nitrogen in urea	283.52	"	18.370	"
Uric acid	1.06	"	0.069	"
Phosphoric acid	67.00	"	4.341	"
Sulphuric acid	51.50	"	3.337	"
Chloride of sodium	106.68	"	6.912	"

This urine presented a copious, fawn-colored sediment, which cleared up with gentle heat. It contained the amorphous urates, with a large number of octahedra of the oxalate of lime.

FÆCES.

Quantity	3.17 oz. av.	90.0	grammes.
Nitrogen	17.05 grains,	1.105	"

Nitrogen in urea and fæces combined....300.57 grains, 19.475 grammes.

Nitrogen of urea and fæces per 100 parts of nitrogen of food..89.75 parts.
Uric acid per 100 parts of urea.......................... 0.174 "

Weight (naked), taken at 12.35 A. M., November 20th, 118.5 (53 k. 745 grammes).

11.55 P. M.	Temperature under the tongue	99.1° (37.3° C.)
	Pulse	78.
	Respirations	23.

November 20th, Fifth Day.

Mr. Weston rose at 10.45 A. M., feeling remarkably well. He took breakfast at 11.30 A. M.; dinner at 5.55 P. M.; and supper at 11.15 P. M. He said he felt "splendidly" all day.

He walked about one mile during the day. He started on his great walk at 12.15 A. M., November 21st. He slept, during the twenty-four hours, ten hours.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Beefsteak	18.25	279.45
Eggs	6.90	57.35
Milk	11.33	32.71
Bread	8.88	41.96
Potatoes	3.00	4.33
Butter	2.75	7.70
Sugar	1.75	00.00
Coffee	32.32	15.53
Tea	16.03	1.40
Salt	0.08	00.00
Pepper	0.05	00.00
	101.34	440.43
	(2,872.63 grammes.)	(28.536 grammes.)

Total ingesta........... (6 lbs., $5\frac{34}{100}$ oz.)
Liquids .... (3 lbs., $11\frac{68}{100}$ oz.)

Analyses of Excretions of Twenty-four Hours.

URINE.

Quantity	34.00 fl ℥.		(1,050.0 c.c.)	
Specific gravity	1025.2.			
Urea	640.13	grains,	41.475	grammes.
Nitrogen in urea	298.73	"	19.355	"
Uric acid	1.73	"	0.112	"
Phosphoric acid	43.01	"	2.787	"
Sulphuric acid	38.18	"	2.474	"
Chloride of sodium	145.85	"	9.450	"

This specimen of urine presented rather a faint, cloudy sediment, which contained a large number of octahedra of the oxalate of lime.

FÆCES.

Quantity	3.97 oz. av.	112.5	grammes.
Nitrogen	21.33 grains,	1.382	"

Nitrogen in urea and fæces combined......320.06 grains, 20.737 grammes.

Nitrogen of urea and fæces per 100 parts of nitrogen of food. 72.67 parts.
Uric acid per 100 parts of urea........................ 0.270 "

11.45 P. M.	Weight (naked)	119.2 lbs. (54 k. 62 grammes.)
	Temperature under the tongue	99.5° (37.5°C.)
	Pulse	93.
	Respirations	25.

Second Period.—Five Days of the Walk.

The walk proposed by Mr. Weston took place in an immense building of corrugated iron, known as the "Empire Skating Rink," on Third Avenue, near Sixty-fourth Street. This building is oblong, measuring 170 by 350 feet. A track made of boards covered with dirt and fine shavings was laid out in the form of a parallelogram. This track was measured by Mr. Joseph L. T. Smith, surveyor, in the presence of Prof. Doremus and myself. The circuit, taken two and a half feet from the inside, measured $735\frac{84}{100}$ feet. This measurement was made with a metallic tape, adjusted for temperature and tested in our presence. In making the measurement, Prof. Doremus was at one end of the tape and I was at the other, and every reading was carefully verified. Seven full circuits and $129\frac{12}{100}$ additional feet made a full mile. In computing the walk, the distance was noted by circuits. Three judges were in attendance day and night; one calling the time of each circuit, and two checking off the circuits in a book provided for that purpose. In addition, either Prof. Doremus, Prof. Mott, or myself, was constantly present. Mr. Weston had retiring-rooms in the front of the building, where his food was prepared, where he slept, and where our observations were taken. The distance from the judge's stand to the door of these rooms was $145\frac{75}{100}$ feet.

During the walk, Mr. Weston took but few regular meals, a great part of his nourishment being taken while actually walking. In this way he took his beef-essence, soft-boiled eggs, gruel, tea, coffee, and all other drinks. I shall not, therefore, give the time of the meals taken during this period, but simply state the entire quantity consumed in each twenty-four hours.

With regard to the distance walked, we are all satisfied that there is no room for doubt. But, although the task proposed was not accomplished, the effort, as a feat of pedestrianism, was so prodigious, that I have thought it best to give the history of these five days pretty fully in detail.

November 21st, First Day.

The following is a summary of the twenty-four hours of November 21st:

12 00 to 12 15 A. M.	15 minutes' rest before starting.
12 15 to 4 9 "	3 h. 54 m. walking 20 miles, with 4 stops for urination, averaging 24 sec. each.
4 9 to 7 58 "	3 h. and 49 m. rest (sleep).
7 58 to 9 6 "	1 h. and 8 m. walking 5 3/7 miles.
9 6 to 9 19 "	13 m. for breakfast.
9 19 A. M. to 1 P. M.	3 h. and 41 m. walking 17 miles, with 5 m. 12 sec. for defecation, and 2 stops for urination, averaging 30 sec. each.
1 00 to 1 46 "	46 m. for dinner.
1 46 to 3 25 "	1 h. and 39 m. walking 8 miles, with 2 stops for urination, averaging 27½ sec. each.
3 25 to 3 32 "	7 minutes' rest, sitting on the track.
3 32 to 5 34 "	2 h. and 2 m. walking 9 4/7 miles, with 2 stops for urination, averaging 26½ sec. each.
5 34 to 6 27 "	53 minutes' rest (supper).
6 27 to 8 38 "	2 h. and 11 m. walking 12 miles, with 3 stops for urination, averaging 26 sec. each.
8 38 to 8 48 "	10 minutes' rest, sitting on the track.
8 48 to 10 32½ "	1 h. 44½ m. walking 8 miles, with 2 stops for urination, averaging 32½ sec. each.
10 32½ to 12 00 "	1 h. 27½ minutes' rest, continued into November 22d, 4 h. 58 m.

During the 24 hours of November 21st, Mr. Weston walked 80 miles in 16 h. and 20 m., including 5 m. 12 sec. for defecation, and 6 m. 45 sec. for urination. Deducting the time for defecation and urination, his walking-time was 16 h. 8 m. and 3 sec., and he averaged a fraction less than 5 miles per hour. He had 17 minutes' rest, sitting by the track, and 7 h. and 23 m. for breakfast, dinner, supper, and sleep. He urinated 15 times on the track. He vomited a little liquid twice during the night, at 10.50 and 11.15. He slept during the twenty-four hours, about 1 hour.

Walking 80 miles....	16 h.	8 m.	3 sec.
Defecation..........		5 "	12 "
Urination...........		6 "	45 "
Rest on the track.....		17 "	
Rest off the track....	7 h.	23 "	
	23 h.	59 m	60 sec.=24 hours.

During the whole of the first day, Mr. Weston seemed to feel very well, and made his walk with great ease. He was a little nauseated at

times, but he stated that he had always more or less disturbance of that kind when he first commenced to walk. He had perfect confidence that he would accomplish the entire walk, as originally proposed.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Mutton-chops	2.00	30.62
Eggs	6.90	57.35
Milk	5.66	16.34
Bread	1.25	5.91
Butter	2.63	7.36
Sugar	1.63	00.00
Coffee	67.67	32.57
Tea	16.03	1.40
Water	6.75	00.00
Lemonade	71.16	00.00
Molasses-and-Water	4.40	00.00
Salt	0.08	00.00
Pepper	0.05	00.00
Bicarbonate of potash	0.04	00.00
	186.25 (5,282.38 grammes.)	151.55 (9.820 grammes.)

Total ingesta......... (11 lbs., 10 $\frac{25}{100}$ oz.)
Liquids.............. (10 lbs., 11 $\frac{67}{100}$ oz.)

Analysis of Excretions of Twenty-four Hours.

URINE.

Quantity	42.09 fl ℥	(1,245.0 c. c.)
Specific gravity	1028.6	
Urea	710.00 grains,	46.065 grammes.
Nitrogen in urea	331.33 "	21.497 "
Uric acid	0.32 "	0.021 "
Phosphoric acid	84.95 "	5.504 "
Sulphuric acid	73.39 "	4.755 "
Chloride of sodium	96.00 "	6.220 "

This specimen of urine presented rather a faint, cloudy sediment, which contained a large number of octahedra of the oxalate of lime.

FÆCES.

Quantity	4.80 oz. av.	136.0 grammes.
Nitrogen	25.77 grains,	1.670 "

Nitrogen in urea and fæces combined.... 357.10 grains, 22.167 "

Nitrogen of urea and fæces per 100 parts of nitrogen of food. 235.63 parts.
Uric acid per 100 parts of urea.......... 0.045 "

10.40 P. M.	Weight (naked)	116.5 lbs. (52 k. 838 grammes.)
	Temperature under the tongue	95.3° (35.3° C.)
	Pulse	98.
	Respirations	20.

November 22d, Second Day.

The following is a summary of the twenty-four hours of November 22d:

12 00 to 4 58 A. M.	4 h. and 58 m. rest, continued from November 21st, before starting, making, during the night of the 21st and 22d, 6 h. and $25\frac{1}{2}$ minutes.
4 58 to 6 58 "	2 h. walking $8\frac{5}{7}$ miles, with 1 stop of 6 m. for defecation.
6 58 to 7 8 "	10 m. rest, sitting on the track.
7 8 to 7 33 "	25 m. walking $1\frac{5}{7}$ miles.
7 33 to 9 5 "	1 h. and 32 m. rest (breakfast).
9 5 to 11 12 "	2 h. and 7 m. walking $9\frac{4}{7}$ miles, with 2 stops for urination, averaging 32 sec. each.
11 12 to 11 27 "	15 m. rest, sitting on the track.
11 27 to 1 41 P. M.	2 h. and 14 m. walking 10 miles, with 2 m. rest and 2 stops for urination, averaging 29 sec. each.
1 41 to 1 55 "	14 m. rest, sitting on the track.
1 55 to 4 5 "	2 h. and 10 m. walking 10 miles, with 1 stop for urination, of 25 sec.
4 5 to 10 24 "	6 h. 19 m. Stopped for sleep, but dozed only. Ate supper before starting again.
10 24 to 12, less 49 sec.	Walking 8 miles in 1 h. 36 m. less 49 sec. on his walk of 112 miles in 24 h., and continued walking into November 23d.

During the 24 hours of November 22d, Mr. Weston walked 48 miles in 10 h. and 32 m., including 6 m. for defecation, and 2 m. 27 sec. for urination. Deducting the time of defecation and urination, his walking-time was 10 h. 23 m. and 33 sec., and he averaged about 4.62 miles per hour. He had 39 minutes' rest, sitting on the track, and 12 h. and 49 m. for breakfast, dinner, supper, and sleep. He urinated 5 times on the track. When he stopped, at 4.5 P. M., he was undressed, and wrapped in a long red-flannel gown and a blanket, carried to a vehicle, and driven about five blocks to a private house to sleep. He states that he did not sleep, but dozed, and got no rest. About 9.30 P. M., he was brought back to the rink in the same way that he was taken out, ate supper, and began at 10.24 P. M. his first attempt to walk one hundred and twelve miles in twenty-four consecutive hours. He seemed cheerful and confident during the entire day. He slept, during the twenty-four hours, 4 hours and 28 minutes.

Walking 48 miles..	10 h.	23 m.	33 sec.
Defecation........		6 "	
Urination..........		2 "	27 "
Rest on the track..		39 "	
Rest off the track..	12 "	49 "	
	22 h.	119 m.	60 sec. = 24 hours.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Roast beef..........	4.00	61.25
Chicken............	2.25	34.45
Eggs	8.28	68.82
Milk	5.66	16.34
Bread	10.50	49.61
Potatoes............	2.00	2.89
Butter	0.50	1.40
Sugar...............	1.75	00.00
Coffee..............	57.82	27.83
Tea	38.08	3.33
Lemonade..........	34.84	00.00
Salt	0.08	00.00
Pepper	0.05	00.00
	165.81	265.92
	(4,700.13 grammes.)	(17,229 grammes.)

Total ingesta........ (10 lbs., 5 $\frac{81}{100}$ oz.)
Liquids............. (8 lbs., 8 $\frac{40}{100}$ oz.)

Analysis of Excretions of Twenty-four Hours.

URINE.

Quantity..............................	33.50 fl ℥. (991.0 c.c.)			
Specific gravity......................	1030.0.			
Urea..................................	702.86 grains,		45.540 grammes.	
Nitrogen in urea......................	328.00	"	21.252	"
Uric acid.............................	0.14	"	0.009	"
Phosphoric acid.......................	72.14	"	4.674	"
Sulphuric acid........................	56.90	"	3.687	"
Chloride of sodium....................	91.68	"	5.940	"

This specimen of urine presented rather a faint, cloudy sediment, which contained a large number of octahedra of the oxalate of lime.

FÆCES.

Quantity................................ 7.94 oz. av., 225.0 grammes.
Nitrogen................................ 42.64 grains, 2.763 "

Nitrogen in urea and fæces combined......370.64 " 24.015 "

Nitrogen of urea and fæces per 100 parts of nitrogen of food..139.39 parts.
Uric acid per 100 parts of urea............................ 0.020 "

10 P. M. {
Weight (naked)..........116.25 lbs. (52k. 724 grammes.)
Temperature under the tongue............94.8° (34.9°C.)
Pulse.................................93.
Respirations..........................23.

November 23d, Third Day.

The following is a summary of the twenty-four hours of November 23d:

12 00 to 6 6 A. M.	6 h. and 6 m. walking $27\frac{4}{7}$ miles, with one stop of 4 m. 30 sec. for rest, and 4 stops for urination, averaging $30\frac{1}{2}$ sec. each.
6 6 to 6 14 "	8 minutes' rest, sitting on the track.
6 14 to 1 31 P. M.	7 h. and 17 m. walking 33 miles, with 4 stops for urination, averaging $31\frac{1}{4}$ sec. each.
1 31 to 1 37 "	6 minutes' rest, sitting on the track.
1 37 to 2 24 "	47 m. walking $3\frac{3}{7}$ miles, with one stop of 34 sec. for urination.
2 24 to 2 31 "	7 minutes' rest, sitting on the track.
2 31 to 3 5 "	34 m. walking $2\frac{3}{4}$ miles.
3 5 to 3 32 "	27 minutes' rest, sitting on the track.
3 32 to 4 46 "	1 h. 14 m. walking $5\frac{1}{4}$ miles, including 2 stops for urination, averaging $27\frac{1}{2}$ sec. each.
4 46 to 5 16 "	30 minutes' rest, sitting on the track.
5 16 to 5 46 "	30 m. walking 2 miles, with one stop of 58 sec. for urination.
5 46 to 6 49 "	1 h. and 3 m. rest in his room (supper).
6 49 to 9 11 "	2 h. and 22 m. walking 11 miles, with one stop of 30 sec. for urination.
9 11 to 9 21 "	10 minutes' rest, sitting on the track.
9 21 to 10 52 "	1 h. and 31 m. walking 7 miles, with one stop of 43 sec. for urination.
10 52 to 12 00 M.	1 h. and 8 m. rest, continued into November 24th.

During the 24 hours of November 23d, Mr. Weston walked 92 miles in 20 h. and 21 m., including 4 m. 30 sec. rest, and 7 m. 47 sec. for urination. His walking-time was 20 h. 8 m. and 43 sec., and he averaged a fraction more than $4\frac{1}{2}$ miles per hour. He had 1 h. 32 m. and 30 sec. rest, sitting on the track, and 2 h. and 11 m. rest in his room. Before 12, midnight, November 22d, he had walked 8 miles in 1 h. 35 m. and 11 sec., making 100 miles in 24 h. and 28 m. His last rest of 1 h. and 8 m. was continued into November 24th 1 h. and 33 m. He urinated on the track 14 times.

During the early part of the day, Mr. Weston seemed cheerful and confident, but after walking about sixty miles, he complained very much of drowsiness, and found it absolutely impossible to make the time necessary to accomplish his hundred and twelve miles in twenty-four consecutive hours. He stated that he was not fatigued, but suffered only from want of sleep. He was not much depressed at his first failure, as he intended to make a second trial of the hundred-and-twelve-mile walk.

He commenced, 10.24 P. M., November 22d, his first attempt to make 112 miles in 24 consecutive hours. He failed on account of want of sleep,

not having slept well the six hours before the attempt. He had no passage from his bowels during this 24 hours. He slept, during the 24 hours, 30 minutes.

Walking 92 miles..........	20 h.	8 m.	43 sec.
Urination		7 m.	47 sec.
Rest on the track..........	1 h.	32 m.	30 sec.
Rest off the track..........	2 h.	11 m.	
	23 h.	58 m.	120 sec.=24 hours.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Beef-essence............	22.26	84.73
Eggs..................	8.28	68.82
Milk	6.18	17.84
Bread..................	1.50	7.09
Oatmeal-gruel	6.78	2.55
Butter..................	0.50	1.40
Sugar..................	2.00	00.00
Coffee..................	95.95	46.18
Lemonade..............	27.56	00.00
Salt....................	0.08	00.00
Pepper..................	0.05	00.00
	171.14	228.61
	(4,851.22 grammes.)	(14.812 grammes.)

Total ingesta..........(10 lbs., $11\frac{14}{100}$ oz.)
Liquids...............(9 lbs., $14\frac{73}{100}$ oz.)

Analysis of Excretions of Twenty-four Hours.

URINE.

Quantity..............................	40.56 fl ℥.	(1,200.0 c.c.)		
Specific gravity......................	1032.5.			
Urea..................................	851.95	grains,	55.200	grammes.
Nitrogen in urea......................	397.58	"	25.760	"
Uric acid.............................	4.74	"	0.307	"
Phosphoric acid.......................	102.25	"	6.625	"
Sulphuric acid........................	63.71	"	4.128	"
Chloride of sodium....................	44.45	"	2.880	"

This specimen presented a whitish, flocculent, and rather copious sediment, which contained a large number of crystals of the oxalate of lime.

NO FÆCES PASSED.

Nitrogen of urea (no fæces) per 100 parts of nitrogen of food 173.91 parts.
Uric acid per 100 parts of urea.......................... 0.566 "

11.15 P. M.	Weight inaccurately taken..............	
	Temperature under the tongue...........	96.6° (35.9°C.)
	Pulse (76 at 5 P. M.).....................	109.
	Respirations...........	22.

November 24th, Fourth Day.

The following is a summary of the twenty-four hours of November 24th:

12 00 to 1 33 A. M.	1 h. 33 m. rest in room, continued from November 23d, making in all, 2 h. 41 m. rest for the night of November 23d and 24th.
1 33 to 4 12 "	2 h. 39 m. walking 10 miles, with 3 m. stop for defecation, and 30 sec. for urination.
4 12 to 9 59 "	5 h. and 47 m. rest in room.
9 59 to 2 58 P. M.	4 h. 59 m. walking 23 4/7 miles, with 3 stops for urination, averaging 30 1/3 sec. each.
2 58 to 3 3 "	5 minutes' rest, sitting on the track.
3 3 to 6 10 "	3 h. and 7 m. walking 14 3/7 miles, with 2 stops for urination, averaging 42 1/2 sec. each.
6 10 to 6 13 "	3 minutes' rest, sitting on the track.
6 13 to 6 29 "	16 m. walking 1 5/7 miles, with 30 sec. for urination.
6 29 to 6 39 "	10 minutes' rest, sitting on the track.
6 39 to 6 51 "	12 m. walking 1 mile.
6 51 to 7 3 "	12 minutes' rest in his room.
7 3 to 7 10 "	7 m. walking 4/7 of a mile.
7 10 to 8 6 "	56 minutes' rest in his room.
8 6 to 8 16 "	10 m. walking 5/7 of a mile, with 40 sec. for urination.
8 16 to 8 21 "	5 minutes' rest, sitting on the track.
8 21 to 8 54 "	33 m. walking 2 1/7 miles.
8 54 to 9 2 "	8 minutes' rest, sitting on the track.
9 2 to 9 21 "	19 m. walking 1 4/7 miles.
9 21 to 9 31 "	10 minutes' rest, sitting on the track.
9 31 to 9 48 "	17 m. walking 1 mile, with 50 sec. for urination.
9 48 to 10 21 "	33 minutes' rest in room.
10 21 to 10 30 "	9 m. walking 3/7 of a mile.
10 30 to 12 00 M.	1 h. and 30 m. rest in room, continued into November 25th.

During the 24 hours of November 24th, Mr. Weston walked 57 miles in 12 h. and 48 m., including 3 m. for defecation, and 5 m. and 26 sec. for urination. His walking-time was 12 h. 39 m. and 34 sec., averaging almost exactly 4 1/2 miles per hour. He had 41 m. rest, sitting on the track, and 10 h. and 31 m. rest in his room. He urinated on the track 10 times. His last rest, 1 h. and 30 m., was continued into November 25th, for 9 h. 56 m., making, during the night of November 24th and 25th, 11 h. 26 m. rest.

He commenced, at 10.13 A. M., his second attempt to walk 112 miles in 24 consecutive hours. At 6.51 P. M. he became very dizzy. This increased so that he staggered, and could hardly see the track. After 6 rests and 6 attempts to continue his walk, he was forced to abandon the attempt at

10.30 P. M. He was excessively depressed at his failure, as it was then impossible for him to accomplish the four hundred miles in five days. He took nothing but a little food, lay down, and went to sleep about midnight. He slept during this twenty-four hours, 1 hour; but his sleep was continued into the next day.

Walking 57 miles..........	12 h.	39 m.	34 sec.
Defecation................		3 m.	
Urination.................		5 m.	26 sec.
Rest on the track..........		41 m.	
Rest off the track..........	10 h.	31 m.	
	22 h.	119 m.	60 sec.=24 hours.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Roast beef..............	1.62	24.81
Beef-essence............	10.33	39.32
Milk...................	8.75	25.27
Bread..................	6.62	31.28
Oatmeal-gruel..........	7.92	2.92
Sugar..................	3.62	00.00
Coffee.................	38.38	18.47
Tea....................	30.06	2.63
Lemonade..............	41.60	00.00
Salt...................	0.08	00.00
Pepper.................	0.05	00.00
Bicarbonate of potash....	0.04	00.00
	149.07 (4,225.61 grammes.)	144.70 (9.376 grammes.)

Total ingesta............(9 lbs., $5\frac{7}{100}$ oz.)
Liquids.................(8 lbs., $9\frac{4}{100}$ oz.)

Analyses of Excretions of Twenty-four Hours.

URINE.

Quantity............................	32.52 fl ℥	(965.0 c.c.)		
Specific gravity.....................	1029.6			
Urea...............................	688.98	grains,	44.641	grammes.
Nitrogen in urea.....................	321.52	"	20.832	"
Uric acid...........................	9.21	"	0.597	"
Phosphoric acid.....................	66.30	"	4.296	"
Sulphuric acid......................	32.66	"	2.116	"
Chloride of sodium..................	28.78	"	1.865	"

This urine presented a faint deposit, like mucus, which contained a moderate number of octahedra of the oxalate of lime, with a few granules of amorphous urates.

FÆCES.

Quantity..........................	5.03 oz. av.	142.5	grammes.
Nitrogen..........................	21.01 grains,	1.750	"
Nitrogen in urea and fæces combined...	348.53 "	22.582	"

Nitrogen of urea and fæces per 100 parts of nitrogen of food..240.86 parts.
Uric acid per 100 parts of urea....................... 1.336 "

10.40 P. M.	Weight (naked)............114 lbs. (51 k. 704 grammes.)
	Temperature under the tongue....... . 96.6° (35.9° C.)
	Pulse............................ 68.
	Respirations........................ 18.

November 25th, Fifth Day.

The following is a summary of the twenty-four hours of November 25th:

12 00 to 9 56 A. M.	9 h. and 56 m. rest before starting, with 1 h. 30 m. of November 24th, make 11 h. 26 m. rest for the night of November 24th and 25th.
9 56 to 10 11 "	15 m. walking 1 mile.
10 11 to 10 16 "	5 minutes' rest in room.
10 16 to 10 58 "	42 m. walking 3 miles, with 1 m. for urination.
10 58 to 11 21 "	23 minutes' rest, sitting on the track.
11 21 to 11 52 "	31 m. walking $2\frac{2}{7}$ miles.
11 52 to 12 42 P. M.	50 minutes' rest in room.
12 42 to 1 1 "	19 m. walking $1\frac{5}{7}$ mile, with 30 sec. for urination.
1 1 to 2 39 "	1 hour 38 minutes' rest in room.
2 39 to 4 19 "	1 h. 40 m. walking 7 miles, with 25 sec. for urination.
4 19 to 4 34 "	15 minutes' rest in room.
4 34 to 6 19 "	1 h. and 45 m. walking 8 miles, with 2 stops for urination, averaging $29\frac{1}{2}$ sec. each.
6 19 to 7 43 "	1 hour and 24 minutes' rest in room.
7 43 to 9 32 "	1 h. and 49 m. walking 9 miles, with 40 sec. for urination.
9 32 to 9 50 "	18 minutes' rest, sitting on the track.
9 50 to 11 31 "	1 h. and 41 m. walking 7 miles, with 2 stops for urination, averaging 25 sec. each.
11 31 to 11 41 "	10 minutes' rest, sitting on the track.
11 41 to 12 00 M.	19 m. walking $1\frac{1}{2}$ miles.

During the twenty-four hours of November 25th, Mr. Weston walked $40\frac{1}{2}$ miles in 9 h. and 1 m., including 4 m. and 24 sec. for urination. His walking-time was 8 h. 56 m. and 36 sec., averaging a fraction more than $4\frac{1}{2}$ miles per hour. He had 51 minutes' rest sitting on the track, and 14 h. and 8 m. rest in his room. He urinated on the track 7 times. After 12 M., he was in remarkably fine condition. He made several rounds in less than 1 minute, one round in 54 sec., on his thirtieth mile, which was

done in 8 m. 32 sec. He walked about 1 mile from 12 to 12.15 A. M., November 26th. At the conclusion of his walk, he was in the best of health and spirits. He slept, during the twenty-four hours, 9 hours and 26 minutes.

Walking 40½ miles...	8 h.	56 m.	36 sec.
Urination..........		4 "	24 "
Rest on the track....		51 "	
Rest in his room.....	14 h.	8 "	
	22 h.	119 m.	60 sec.=24 hours.

TOTAL MILES WALKED.

Nov. 21st......................	80 miles.
" 22d.....................	48 "
" 23d......................	92 "
" 24th......................	57 "
" 25th......................	40½ "
	317½ miles.

In going thirty-two times to his room, Mr. Weston walked, in addition to the above, 0.883 of a mile. From midnight, November 25th, to 12.15 A. M., November 26th, he walked 1¼ miles, to complete his five days. This, with the few feet to the urinal, makes about 320 miles in five consecutive days.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Roast beef...........	3.00	45.94
Chicken.............	11.00	168.44
Beef-essence..........	9.54	36.31
Eggs................	4.14	34.41
Milk................	9.78	28.24
Bread...............	9.00	42.52
Potatoes.............	4.00	5.77
Oatmeal-gruel........	3.39	1.28
Butter..............	1.25	3.50
Sugar...............	2.37	00.00
Tomatoes............	3.12	00.00
Coffee..............	27.27	13.12
Tea................	40.08	3.51
Lemonade...........	52.00	00.00
Water...............	5.00	00.00
Salt................	0.08	00.00
Pepper..............	0.05	00.00
	185.07	383.04
	(5,246.09 grammes.)	(24.818 grammes.)

Total ingesta......... (11 lbs., $9\frac{7}{100}$ oz.)

Liquids.............. (9 lbs., $7\frac{6}{100}$ oz.)

Analyses of Excretions of Twenty-four Hours.

URINE.

Quantity	43.60 fl ℥	(1,290.0 c. c.)		
Specific gravity	1022.6			
Urea	657.02	grains,	42.570	grammes.
Nitrogen in urea	306.61	"	19.866	"
Uric acid	0.57	"	0.037	"
Phosphoric acid	57.49	"	3.725	"
Sulphuric acid	40.84	"	2.646	"
Chloride of sodium	64.50	"	4.179	"

This urine presented a whitish, grumous sediment, rather copious, which contained a few octahedra of the oxalate of lime, with a few granules of amorphous phosphates.

FÆCES.

Quantity	4.87 oz. av.	138.0	grammes.
Nitrogen	26.16 grains,	1.695	"
Nitrogen in urea and fæces combined	332.77 "	21.561	"

Nitrogen of urea and fæces per 100 parts of nitrogen of food . . 84.27 parts.
Uric acid per 100 parts of urea . . . 0.087 "

1.30 A. M., Nov. 26th.	Weight (naked)	115.75 lbs. (52 k. 497 grammes.)
	Temperature under the tongue	97.9° (36.6° C.)
	Pulse	80.
	Respirations	20.

Third Period.—Five Days after the Walk.

Notwithstanding the immense muscular and nervous strain to which Mr. Weston had subjected himself for the past five days, culminating on the fourth day in complete prostration of the nervous system, he sat up, talked and joked with his friends until 1.40 A. M., November 26th, then went to bed, and slept well until 10 A. M. He then got up, feeling splendidly; wakening his attendants, who were almost exhausted by the five days' labor and watching, and called for his breakfast, which he ate at 11.45, with excellent appetite. For the succeeding five days, he felt as well as ever. During these five days, he did absolutely nothing but eat, sleep, and amuse himself, attending to no business. He took no exercise, walking only about two miles a day, though he said he felt as if he could walk one hundred miles any day without difficulty. The history of this period closed our investigations.

November 26th, First Day.

Mr. Weston slept well. He took breakfast at 11.45 A. M., and dinner at 6.45 P. M. He smoked during the day, six cigars. He walked two miles. He slept, during the twenty-four hours, 8 hours and 20 minutes.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Turkey	7.50	114.84
Chicken	5.12	78.40
Fish	3.50	53.59
Eggs	4.14	34.41
Milk	2.06	5.95
Custard	3.25	18.20
Ice-cream	3,50	19.60
Bread	7.75	36.62
Potatoes	5.00	7.22
Butter	1.88	5.26
Sugar	0.88	00.00
Cauliflower	3.00	00.00
Cranberries	5.00	00.00
Celery	1.00	00.00
Lettuce	1.25	00.00
Grapes	1.00	00.00
Apples	5.00	00.00
Coffee	24.24	11.56
Lemonade	14.68	00.00
Water	30.00	00.00
Salt	0.15	00.00
Pepper	0.05	00.00
	129.95	385.65
	(3,683.63 grammes.)	(24.987 grammes.)

Total ingesta......... (8 lbs., $1\frac{95}{100}$ oz.)
Liquids.............. (2 lbs., $14\frac{74}{100}$ oz.)

Analysis of Excretions of Twenty-four Hours.

URINE.

Quantity	31.59 fl ℥	(937.5 c. c.)		
Specific gravity	1025.8			
Urea	593.23	grains,	38.437	grammes.
Nitrogen in urea	276.84	"	17.937	"
Uric acid	0.48	"	0.031	"
Phosphoric acid	29.06	"	1.883	"
Sulphuric acid	49.53	"	3.209	"
Chloride of sodium	66.41	"	4.303	"

This urine presented a rather heavy, whitish sediment, in considerable quantity, which contained numerous granules of the amorphous urates, with a very few octahedra of the oxalate of lime.

FÆCES.

Quantity	3.51 oz. av.	99.5	grammes.
Nitrogen	18.86 grains,	1.222	"
Nitrogen in urea and fæces combined	295.70 "	19.159	"

Nitrogen of urea and fæces per 100 parts of nitrogen of food . . 76.68 parts.
Uric acid per 100 parts of urea . . . . 0.081 "

12.10 A. M., Nov. 27th.	Weight (naked)	118 lbs. (53 k. 518 grammes.)
	Temperature under the tongue	98.6° (37° C.)
	Pulse	76.
	Respirations	22.

November 27th, Second Day.

Mr. Weston slept well. He took breakfast at 10 A. M.; dinner at 2 P. M.; and supper at 6.45 P. M. He smoked during the day, seven cigars. He walked about two miles. He slept, during the twenty-four hours, 8 hours and 15 minutes.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Beefsteak	5.00	76.56
Roast beef	2.50	38.28
Turkey	9.00	137.81
Head-cheese	1.50	14.70
Eggs	4.14	34.41
Milk	5.14	14.87
Bread	16.15	76.31
Cheese	1.13	20.28
Potatoes	10.25	14.82
Oysters	3.90	36.34
Ice-cream	2.88	16.13
Butter	2.75	7.70
Sugar	1.56	00.00
Tomatoes	5.25	00.00
Cranberries	4.50	00.00
Preserves	4.75	00.00
Catsup	0.42	00.00
Coffee	19.19	9.23
Tea	19.04	1.66
Molasses-and-Water	21.45	00.00
Water	40.00	00.00
Salt	0.05	00.00
Pepper	0.06	00.00
	180.61	499.10
	(5,119.66 grammes.)	(32.338 grammes.)

Total ingesta . . . . (11 lbs., $4\frac{61}{100}$ oz.)
Liquids . . . . (6 lbs., $8\frac{82}{100}$ oz.)

Analysis of Excretions of Twenty-four Hours.

URINE.

Quantity	46.14 fl ℥	(1,365.0 c. c.)		
Specific gravity	1024.4			
Urea	716.29	grains,	46.410	grammes.
Nitrogen in urea	334.27	"	21.658	"
Uric acid	0.52	"	0.034	"
Phosphoric acid	46.93	"	3.041	"
Sulphuric acid	46.07	"	2.985	"
Chloride of sodium	170.64	"	11.056	"

This urine presented a slight sediment of a whitish appearance, which contained a few octahedra of the oxalate of lime, and a few groups of small crystals of uric acid.

FÆCES.

Quantity	4.57 oz. av.	129.5	grammes.
Nitrogen	24.54 grains,	1.590	"
Nitrogen in urea and fæces combined	358.81 "	23.248	"

Nitrogen of urea and fæces per 100 parts of nitrogen of food	71.81	parts.
Uric acid per 100 parts of urea	0.072	"

11. P. M.	Weight (naked)	120.25 lbs. (54 k. 539 grammes.)
	Temperature under the tongue	98.4° (36.9° C.)
	Pulse	73.
	Respirations	22.

November 28*th*, *Third Day.*

Mr. Weston slept well. He took breakfast at 8.50 A. M.; dinner at 4.15 P. M.; and supper at 7.45 P. M. He smoked during the day, five cigars. He walked about two miles. He slept, during the twenty-four hours, 8 hours and 50 minutes.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Beefsteak	9.37	143.48
Oysters	5.62	53.37
Eggs	4.14	34.41
Milk	9.27	26.76
Cream-cakes	3.37	18.97
Bread	11.62	54.80
Cheese	1.25	22.53
Potatoes	11.00	15.88
Butter	2.75	7.70
Sugar	2.78	00.00
Tomatoes	3.75	00.00

	Oz. Av.	Nitrogen, in grains.
Sweet pickles........	2.18	00.00
Apples..............	3.12	00.00
Grapes..............	2.75	00.00
Coffee...............	32.32	15.53
Tea.................	16.03	1.40
Salt.................	0.06	00.00
Pepper..............	0.06	00.00
Vinegar.............	0.25	00.00
	121.69	394.83
	(3,449.49 grammes.)	(25.582 grammes.)

Total ingesta.......... (7 lbs., $9\frac{69}{100}$ oz.)
Liquids............... (3 lbs., $9\frac{87}{100}$ oz.)

Analysis of Excretions of Twenty-four Hours.

URINE.

Quantity............................	84.18 fl ℥	(2,490.0 c. c.)		
Specific gravity.....................	1019.7			
Urea...............................	768.61	grains,	49.800	grammes.
Nitrogen in urea.....................	358.68	"	23.240	"
Uric acid............................	0.31	"	0.020	"
Phosphoric acid......................	105.68	"	6.847	"
Sulphuric acid.......................	53.57	"	3.471	"
Chloride of sodium...................	622.58	"	40.338	"

This urine presented a slight sediment of a whitish appearance, which contained a few octahedra of the oxalate of lime, and a few groups of small crystals of uric acid.

FÆCES.

Quantity..........................	9.53 oz. av.	270.0	grammes.
Nitrogen..........................	51.19 grains,	3.316	"
Nitrogen in urea and fæces combined...	409.87 "	26.556	"

Nitrogen in urea and fæces per 100 parts of nitrogen of food..103.81 parts.
Uric acid per 100 parts of urea.......................... 0.040 "

10.30 P. M.	Weight (naked).........120.25 lbs.	(54 k. 539 grammes.)
	Temperature under the tongue.........	99.3° (37.4° C.)
	Pulse................................	70.
	Respirations.........................	22.

November 29th, Fourth Day.

Mr. Weston slept well. He took breakfast at 9.35 A. M.; dinner at 2 P. M.; supper at 6.30 A. M.; and a second supper (which weighed 3 lbs., 6.75 oz. av.) at 11.15 P. M. He smoked five cigars during the day. He walked about two miles. He slept, during the twenty-four hours, 7 hours and 35 minutes.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Beefsteak	4.25	65.08
Roast beef	2.75	42.11
Chicken	15.00	229.69
Eggs	4.14	34.41
Milk	6.25	18.05
Bread	18.63	88.03
Potatoes	13.50	20.59
Cheese	1.00	18.03
Rice-pudding	14.75	77.15
Butter	5.12	14.33
Sugar	2.12	00.00
Tomatoes	7.38	00.00
Tomato-soup	8.00	00.00
Celery	1.00	00.00
Figs	2.37	9.54
Apples	7.00	00.00
Coffee	48.48	23.30
Tea	16.03	1.40
Water	10.00	00.00
Salt	0.16	00.00
Pepper	0.08	00.00
	188.01	641.71
	(5.329.43 grammes.)	(41.578 grammes.)

Total ingesta........ (11 lbs., $12\frac{1}{100}$ oz.)
Liquids............ (5 lbs., $8\frac{76}{100}$ oz.)

Analysis of Excretions of Twenty-four Hours.

URINE.

Quantity	60.38 fl ℥	(1,786.0 c. c.)		
Specific gravity	1022.5			
Urea	744.32	grains,	48.226	grammes.
Nitrogen in urea	347.35	"	22.505	"
Uric acid	2.51	"	0.163	"
Phosphoric acid	50.76	"	3.289	"
Sulphuric acid	48.73	"	3.157	"
Chloride of sodium	297.70	"	19.288	"

This urine presented hardly any sediment. The microscopical examination was entirely negative.

FÆCES.

Quantity	6.61	oz. av.	187.5	grammes.
Nitrogen	35.54	grains,	2.303	"
Nitrogen in urea and fæces combined	382.89	"	24.808	"

Nitrogen of urea and fæces per 100 parts of nitrogen of food.. 59.67 parts.
Uric acid per 100 parts of urea........................... 0.337 "

12.20 A. M., Nov. 30th.	Weight[1] (naked)	123.5 lbs. (56 k. 13 grammes.)
	Temperature under the tongue	98.8° (37.1° C.)
	Pulse	78.
	Respirations	24.

November 30th, Fifth Day.

Mr. Weston slept well. He took breakfast at 9.15 A. M.; dinner at 1.45 P. M.; and supper at 6.15 P. M. He smoked during the day, six cigars. He walked about three miles. He had a headache all the evening. He slept, during the twenty-four hours, 7 hours and 45 minutes. The records were closed at midnight.

Weights and Analyses of Food and Drink for the Twenty-four Hours.

	Oz. Av.	Nitrogen, in grains.
Beefsteak	1.88	28.79
Roast beef	3.37	51.60
Fish	3.00	45.94
Milk	5.66	16.34
Bread	21.00	99.22
Potatoes	5.94	8.58
Butter	4.12	11.54
Sugar	1.88	00.00
Tomatoes	3.12	00.00
Tomato-soup	8.00	00.00
Figs	2.06	8.29
Preserved citron	2.25	00.00
Coffee	24.24	11.65
Tea	16.03	1.40
Salt	0.06	00.00
Pepper	0.06	00.00
	102.67	283.35
	(2,910.34 grammes.)	(18.359 grammes.)

Total ingesta......... (6 lbs., $6\frac{67}{100}$ oz.)
Liquids.............. (2 lbs., $15\frac{93}{100}$ oz.)

[1] This great increase in weight is accounted for by 3 lbs. 6.75 oz. of food taken at 11.15 P. M.

Analysis of Excretions of Twenty-four Hours.

URINE.

Quantity	68.39 fl ℥	(2,023.0 c. c.)		
Specific gravity	1022.6			
Urea	811.48	grains,	52.598	grammes.
Nitrogen in urea	378.69	"	24.546	"
Uric acid	3.30	"	0.214	"
Phosphoric acid	52.00	"	3.364	"
Sulphuric acid	47.20	"	3.058	"
Chloride of sodium	404.65	"	26.218	"

This urine presented a cloudy sediment in moderate quantity, which contained a moderate number of octahedra of the oxalate of lime.

FÆCES.

Quantity	7.41	oz. av.	210.0	grammes.
Nitrogen	39.80	grains,	2.579	"
Nitrogen in urea and fæces combined	418.49	"	27.125	"

Nitrogen of urea and fæces per 100 parts of nitrogen of food . . 147.69 parts.
Uric acid per 100 parts of urea . . . . 0.406 "

12 M.	Weight (naked)	120.75 lbs. (54 k. 765 grammes.)
	Temperature under the tongue	97.5° (36.4° C.)
	Pulse	76.
	Respirations	24.

CONSOLIDATED TABLES.

I propose to present, in a series of consolidated tables, the complete history of the fifteen days, divided, as before, into three periods of five days each, in the form in which they will be made use of in Part II. in making the final deductions. I present them in this form complete, so that all or any part of them may serve as material for others. The cutaneous and pulmonary exhalations are estimated by subtracting the weight of urine and fæces from the weight of ingesta ; to this result adding any loss of weight, or subtracting from it any gain in the weight of the body during the twenty-four hours.

The weights are given in pounds and ounces avoirdupois, and in grains troy. The equivalents in French weights are given in parentheses :

TABLE A[1].

Weight, Temperature, Pulse, etc.

First Period—Five Days before the Walk.

	1st Day, Nov. 16th.	2d Day, Nov. 17th.	3d Day, Nov. 18th.	4th Day, Nov. 19th.	5th Day, Nov. 20th.
Weight of the body (naked).	120.5 lbs. (54 k.655 gr.)	121.25 lbs. (55 kilogr.)	120 lbs. (54 k.432 gr.)	118.5 lbs. (53 k.745 gr.)	119.2 lbs. (54 k. 62 gr.)
Temperature under tongue..	99.7° Fahr. (37.6° C.)	98.4° Fahr. (36.9° C.)	98° Fahr. (36.7° C.)	99.1° Fahr. (37.3° C.)	99.5° Fahr. (37.5° C.)
Pulse (sitting and tranquil).	75	73	71	78	93
Respirations " .	20	20	20	23	25
Weights of ingesta.........	122.99 oz. (3,492.17 gr.)	105.43 oz. (2,987.92 gr.)	86.56 oz. (2,453.67 gr.)	86.19 oz. (2,443.19 gr.)	101.34 oz. (2,872.63 gr.)
Weights of urine and fæces.	44.20 oz. (1,303.08 gr.)	43.73 oz. (1,287.95 gr.)	51.98 oz. (1,531.53 gr.)	36.51 oz. (1,076.50 gr.)	38.83 oz. (1,188.96 gr.)
Estimated cutaneous and pulmonary exhalation	78.79 oz. (2,189.09 gr.)	49.70 oz. (1,354.97 gr.)	54.58 oz. (1,497.14 gr.)	73.58 oz. (2,046.69 gr.)	51.51 oz. (1,366.67 gr.)
Number of hours of sleep...	7 h. 30 m.	6 h. 40 m.	9 h.	7 h. 15 m.	10 h.
Number of miles walked....	15	5	5	15	1

TABLE B[1].

Weights and Analyses of Food and Drink.

First Period—Five Days before the Walk.

	1st Day, Nov. 16th.		2d Day, Nov. 17th.		3d Day, Nov. 18th.		4th Day, Nov. 19th.		5th Day, Nov. 20th.	
	Quantity in Oz.	Nitrogen in Grains.	Quantity in Oz.	Nitrogen in Grains.	Quantity in Oz.	Nitrogen in Grains.	Quantity in Oz.	Nitrogen in Grains.	Quantity in Oz.	Nitrogen in Grains.
Meats ...N. 3.50 p. c.	15.25	233.52	10.50	160.78	10.37	158.79	14.01	214.52	18.25	279.45
Eggs.....N. 1.90 "	2.76	22,94	4.14	34.41	2.76	22.94	4.14	34.41	6.90	57.35
Milk.....N. 0.66 "	7.21	20.82	4.63	13.37	7.21	20.82	4.38	12.65	11.33	32.71
Bread....N. 1.08 "	9.88	47.48	8.50	40.16	7.75	36.62	10.25	48.43	8.88	41.96
Potatoes.N. 0.33 "	8.25	11.99	10.00	14.44	5.13	7.41	0.88	1.27	3.00	4.33
Butter....N. 0.64 "	2.12	5.94	2.95	8.26	3.13	8.76	2.43	6.80	2.75	7.70
Coffee ...N. 0.11 "	35.60	17.13	32.32	15.53	32.32	15.53	32.32	15.53	32.32	15.53
Tea......N. 0.02 "	16.03	1.40	16.03	1.40	16.03	1.40	16.03	1.40	16.03	1.40
Non-nitrogenized matters	25.89	..	16.36	..	1.86	..	1.75	..	1.88	..
Total............	122.99	361.22	105.43	288.35	86.56	272.27	86.19	335.01	101.34	440.43
Total in grammes.	3,492.17	23.404	2,987.92	18.682	2,453.67	17.641	2,443.19	21.706	2,872.63	28.536

Average of five days, quantity of food and drink................. 100.50 oz.
" " " .... 2,848.82 grammes.
" Nitrogen " .... 339.46 grains.
" " " .... 21.994 grammes.

TABLE C[1].

Analyses of Excretions.—Urine and Fæces.

First Period—Five Days before the Walk.

(French weights in parentheses.)

URINE.	1st Day, Nov. 16th.	2d Day, Nov. 17th.	3d Day, Nov. 18th.	4th Day, Nov. 19th.	5th Day, Nov. 20th.	Averages.
Quantity	39.55 fl. oz.	38.03 fl. oz.	46.15 fl. oz.	32.45 fl. oz.	34.00 fl. oz.	37.84 fl. oz.
	(1,170.0 c. c.)	(1,125.0 c. c.)	(1,365.0 c. c.)	(960.0 c. c.)	(1,050.0 c. c.)	(1,134.0 c. c.)
Specific gravity	1024.0	1024.4	1023.1	1027.6	1025.2	1024.9
Urea	650.08 grains	590.35 grains	653.08 grains	607.55 grains	640.13 grains	628.24 grains
	(42.120)	(38.250)	(42.315)	(39.365)	(41.475)	(40.705)
Nitrogen in urea	303.37 "	275.50 "	304.77 "	283.52 "	298.73 "	293.18 "
	(19.656)	(16.517)	(19.747)	(18.370)	(19.355)	(18.729)
Uric acid	3.55 "	4.03 "	0.94 "	1.06 "	1.73 "	2.26 "
	(0.230)	(0.261)	(0.061)	(0.069)	(0.112)	(0.127)
Phosphoric acid	51.46 "	44.08 "	45.14 "	67.00 "	43.01 "	50.14 "
	(3.334)	(2.921)	(2.925)	(4.341)	(2.787)	(3.262)
Sulphuric acid	38.37 "	40.92 "	38.86 "	51.50 "	38.18 "	41.57 "
	(2.486)	(2.651)	(2.518)	(3.337)	(2.474)	(2.693)
Chloride of sodium	195.02 "	158.00 "	191.70 "	106.68 "	145.85 "	159.45 "
	(12.636)	(10.237)	(12.421)	(6.912)	(9.450)	(10.331)
Abnormal matters	Large amount of oxalate of lime (octahedra).	Larger amount of oxalate than on Nov. 16th.	Small amount of oxalate.	Large amount of oxalate, with amorphous urates.	Large amount of oxalate.	
FÆCES.						
Quantity	3.70 oz.	4.78 oz.	4.76 oz.	3.17 oz.	3.97 oz.	4.08 oz.
	(105.0)	(135.5)	(135.0)	(90.0)	(112.5)	(115.6)
Nitrogen in fæces	19.89 grains	25.68 grains	25.59 grains	17.05 grains	21.33 grains	21.91 grains
	(1.289)	(1.664)	(1.658)	(1.105)	(1.382)	(1.421)
Nitrogen in urea and fæces combined	323.26 grains	301.18 grains	330.36 grains	300.57 grains	320.06 grains	315.09 grains
	(20.945)	(18.181)	(21.405)	(19.475)	(20.737)	(20.149)
N. of urea & fæces per 100 pts. N. food	89.49	104.45	121.30	89.75	72.67	95.53
Uric acid per 100 pts. of urea	0.538	0.683	0.144	0.174	0.270	0.362

The fæces contained an average of 72 per cent. of water.

TABLE A[2].

Weight, Temperature, Pulse, etc.

Second Period—Five Days of the Walk.

	1st Day, Nov. 21st.	2d Day, Nov. 22d.	3d Day, Nov. 23d.	4th Day, Nov. 24th.	5th Day, Nov. 25th.
Weight of the body.........	116.5 lbs. (52k. 838gr.)	116.25 lbs. (52k. 724gr.)	Estimated. 115 lbs. (52k. 157gr.)	114 lbs. (51k. 704gr.)	115.75 lbs. (52k. 497gr.)
Temperature under tongue.	95.3° Fahr. (35.3° C.)	94.8° Fahr. (34.9° C.)	96.6° Fahr. (35.9° C.)	96.6° Fahr. (35.9° C.)	97.9° Fahr. (36.6° C.)
Pulse (sitting and tranquil).	98	93	109	68	80
Respirations " .	20	23	22	18	20
Weights of ingesta..........	186.25 oz. (5,282.38 gr.)	165.81 oz. (4,700.13 gr.)	171.14 oz. (4,851.22 gr.)	149.07 oz. (4,225.61 gr.)	185.07 oz. (5,246.09 gr.)
Weights of urine and fæces.	48.09 oz. (1,416.61 gr.)	42.54 oz. (1,245.73 gr.)	41.88 oz. (1,239.00 gr.)	38.51 oz. (1,136.06 gr.)	49.45 oz. (1,457.15 gr.)
Estimated cutaneous and pulmonary exhalation	181.36 oz. (5,089.78 gr.)	127.27 oz. (3,568.40 gr.)	149.26 oz. (4,179.22 gr.)	126.56 oz. (3,542.55 gr.)	107.62 oz. (2,995.94 gr.)
Number of hours of sleep...	1h.	4h. 28m. dozed 5h.	30m.	1h.	9h. 26m.
Number of miles walked....	80	48	92	57	40.5
Walking-time...............	16h. 8m. 3s.	10h.23m.33s.	20h. 8m. 43s.	12h.30m.34s.	8h. 56m. 36s.
Rate per hour..............	ab't 5 miles	4.62 miles	ab't 4.5 m'l's	4.5 miles	ab't 4.5 m'ls
Urination..................	6m. 45s.	2m. 27s.	7m. 47s.	5m. 26s.	4m. 24s.
Defecation.................	5m. 12s.	6m.	none	3m.	off the track
Rest on the track..........	17m.	39m.	1h. 32m. 30s.	41m.	51m.
Rest off the track.........	7h. 23m.	12h. 49m.	2h. 11m.	14h. 8m.	14h. 8m.

TABLE B[2].

Weights and Analyses of Food and Drink.

Second Period—Five Days of the Walk.

	1st Day, Nov. 21st.		2d Day, Nov. 22d.		3d Day, Nov. 23d.		4th Day, Nov. 24th.		5th Day, Nov. 25th.	
	Quantity in Oz.	Nitrogen in Grains.	Quantity in Oz.	Nitrogen in Grains.	Quantity in Oz.	Nitrogen in Grains.	Quantity in Oz.	Nitrogen in Grains.	Quantity in Oz.	Nitrogen in Grains.
Meats ...N. 3.50 p. c.	2.00	30.62	6.25	95.70	..	..	1.62	24.81	14.00	214.38
Eggs.....N. 1.90 "	6.90	57.35	8.28	68.82	8.28	68.82	..	..	4.14	34.41
Milk.....N. 0.66 "	5.66	16.34	5.66	16.34	6.18	17.84	8.75	25.27	9.78	28.24
Bread....N. 1.08 "	1.25	5.91	10.50	49.61	1.50	7.09	6.62	31.28	9.00	42.52
Beef-essence..N. 0.87 "	..	..	..	..	22.26	84.73	10.33	39.32	9.54	36.31
Oatmeal-gruel ..N. 0.086 "	..	..	..	..	6.78	2.55	7.92	2.92	3.39	1.28
Potatoes.N. 0.33 "	..	..	2.00	2.89	..	..	..	..	4.00	5.77
Butter...N. 0.64 "	2.63	7.36	0.50	1.40	0.50	1.40	..	..	1.25	3.50
Coffee ...N. 0.11 "	67.67	32.57	57.82	27.83	95.95	46.18	38.38	18.47	27.27	13.12
Tea......N. 0.02 "	16.03	1.40	38.08	3.33	..	..	30.06	2.63	40.08	3.51
Non-nitrogenized matters...........	84.11	..	36.72	..	29.69	..	45.39	..	62.62	..
Total.............	186.25	151.55	165.81	265.92	171.14	228.61	149.07	144.70	185.07	383.04
Total in grammes.	5,282.38	9.820	4,700.13	17.229	4,851.22	14.812	4,225.61	9.376	5,246.09	24.818

Average of five days, quantity of food and drink................ 171.47 oz.
" " " .... 4,860.57 grammes.
" Nitrogen " .... 234.76 grains.
" " " .... 13.211 grammes.

TABLE C(2).

Analyses of Excretions.—Urine and Fæces.

Second Period—Five Days of the Walk.

(French weights in parentheses.)

URINE.	1st Day, Nov. 21.	2d Day, Nov. 22.	3d Day, Nov. 23.	4th Day, Nov. 24.	5th Day, Nov. 25.	Averages.
Quantity	42.09 fl. oz. (1,245.0 c. c.)	33.50 fl. oz. (991.0 c. c.)	40.56 fl. oz. (1,200.0 c. c.)	32.52 fl. oz. (965.0 c. c.)	43.60 fl. oz. (1,290.0 c. c.)	38.46 fl. oz. (1,138.0 c. c.)
Specific gravity	1028.6	1030.0	1032.5	1029.6	1022.6	1028.7
Urea	710.00 grains (46.065)	702.86 grains (45.540)	851.95 grains (55.200)	688.98 grains (44.641)	657.02 grains (42.570)	722.16 grains (46.803)
Nitrogen in urea	331.33 " (21.497)	328.00 " (21.252)	397.58 " (25.760)	321.52 " (20.832)	306.61 " (19.866)	337.01 " (21.841)
Uric acid	0.32 " (0.021)	0.14 " (0.009)	4.74 " (0.307)	9.21 " (0.597)	0.57 " (0.037)	3.00 " (0.194)
Phosphoric acid	84.95 " (5.504)	72.14 " (4.674)	102.25 " (6.625)	66.30 " (4.296)	57.49 " (3.725)	76.63 " (4 965)
Sulphuric acid	73.39 " (4.755)	56.90 " (3.687)	63.71 " (4.128)	32.66 " (2.116)	40.84 " (2.646)	53.50 " (3.666)
Chloride of sodium	96.00 " (6.220)	91.68 " (5.940)	44.45 " (2.880)	28.78 " (1.865)	64.50 " (4.179)	65.08 " (4.217)
Abnormal matters	Large amount of oxalate of lime (octahedra).	Same as Nov. 21st.	Very large amount of oxalate.	Small amount of oxalate.	Small am'nt of oxalate, with amorphous phos.	
FÆCES.						
Quantity	4.80 oz. (136.0)	7.94 oz. (225.0)	None	5.03 oz. (142.5)	4.87 oz. (138.0)	4.53 oz. (128.3)
Nitrogen in fæces	25.77 grains (1.670)	42.64 grains (2.763)	"	27.01 grains (1.750)	26.16 grains (1.695)	24.32 grains (1.576)
Nitrogen in urea and fæces combined	357.10 grains (22.167)	370.64 grains (24.015)	397.58 grains (25.760)	348.53 grains (22.582)	332.77 grains (21.561)	361.52 grains (23.217)
Nitrogen of urea and fæces per 100 pts. N. food.	235.63	139.39	173.91	240.86	84.27	174.81
Uric acid per 100 pts. of urea	0.045	0.020	0.556	1.336	0.087	0.409

The fæces contained an average of 72 per cent. of water.

TABLE A[3].

Weight, Temperature, Pulse, etc.

Third Period—Five Days after the Walk.

	1st Day, Nov. 26th.	2d Day, Nov. 27th.	3d Day, Nov. 28th.	4th Day, Nov. 29th.	5th Day, Nov. 30th.
Weight of the body........	118 lbs. (53k. 518gr.)	120.25 lbs. (54k. 539gr.)	120.25 lbs. (54k. 539gr.)	123.5 lbs. (56k. 13gr.)	120.75 lbs. (54k. 765gr.)
Temperature under tongue.	98.6° Fahr. (37° C.)	98.4° Fahr. (36.9° C.)	99.3° Fahr. (37.4° C.)	98.8° Fahr. (37.1° C.)	97.5° Fahr. (36.4° C.)
Pulse (sitting and tranquil).	76	73	70	78	76
Respirations " .	22	22	22	24	24
Weights of ingesta.........	129.95 oz. (3,683.63 gr.)	180.61 oz. (5,119.66 gr.)	121.69 oz. (3,449.49 gr.)	188.01 oz. (5,329.43 gr.)	102.67 oz. (2,910.34 gr.)
Weights of urine and fæces.	35.91 oz. (1,061.19 gr.)	51.84 oz. (1,527.81 gr.)	95.37 oz. (2,809.25 gr.)	68.36 oz. (2,013.68 gr.)	77.34 oz. (2,278.72 gr.)
Estimated cutaneous and pulmonary exhalation	58.04 oz. (1,601.44 gr.)	92.77 oz. (2,570.85 gr.)	26.32 oz. (640.24 gr.)	67.65 oz. (1,841.75 gr.)	69.33 oz. (1,879.62 gr.)
Number of hours of sleep...	8h. 20m.	8h. 15m.	8h. 50m.	7h. 35m.	7h. 45m.
Number of miles walked...	2	2	2	2	3

TABLE B[3].

Weights and Analyses of Food and Drink.

Third Period—Five Days after the Walk.

	1st Day, Nov. 26th.		2d Day, Nov. 27th.		3d Day, Nov. 28th.		4th Day, Nov. 29th.		5th Day, Nov. 30th.	
	Quantity in Oz.	Nitrogen in Grains.	Quantity in Oz.	Nitrogen in Grains.	Quantity in Oz.	Nitrogen in Grains.	Quantity in Oz.	Nitrogen in Grains.	Quantity in Oz.	Nitrogen in Grains.
Meats ...N. 3.50 p. c.	16.12	246.83	16.50	252.65	9.37	143.48	22.00	336.88	8.25	126.33
Eggs.....N. 1.90 "	4.14	34.41	4.14	34.41	4.14	34.41	4.14	34.41	..	..
Milk.... N. 0.66 "	2.06	5.95	5.14	14.87	9.27	26.76	6.25	18.05	5.66	16.34
Custard..N. 1.28 "	3.25	18.20	..	..	..	..	..	..	..	..
Ice cream N. 1.28 "	3.50	19.60	2.88	16.13	..	..	..	..	..	..
Cream-cakes..N. 1.28 "	..	..	..	..	3.37	18.97	..	..	..	..
Oysters..N. 2.13 "	..	..	3.90	36.34	5.62	53.37	..	..	..	..
Rice-pudding...N. 1.18 "	..	..	..	..	..	..	14.75	77.15	..	..
Head-cheese. N. 2.24 "	..	..	1.50	14.70	..	..	1.00	18.03	..	..
Figs.....N. 0.92 "	..	..	..	..	..	..	2.37	9.51	2.06	8.29
Cheese...N. 4.12 "	..	..	1.13	20.28	1.25	22.53	..	..	..	..
Bread....N. 1.08 "	7.75	36.62	16.15	76.31	11.62	54.80	18.63	88.03	21.00	99.22
Potatoes. N. 0.33 "	5.00	7.22	10.25	14.82	11.00	15.88	13.50	20.59	5.94	8.58
Butter...N. 0.64 "	1.88	5.26	2.75	7.70	2.75	7.70	5.12	14.33	4.12	11.54
Coffee ...N. 0.11 "	24.24	11.56	19.19	9.23	32.32	15.53	48.48	23.30	24.24	11.65
Tea......N. 0.02 "	..	..	19.04	1.66	16.03	1.40	16.03	1.40	16.03	1.40
Non - nitrogenized matters..........	62.01	..	78.04	..	14.95	..	35.74	..	15.37	..
Total.............	129.95	385.65	180.61	499.10	121.69	394.83	188.01	641.71	102.67	283.35
Total in grammes.	3,683.63	24.987	5,119.66	32.338	3,449.49	25.582	5,329.43	41.578	2,910.34	18.359

Average for five days, quantity of food and drink.............. 144.59 oz.
" " " .... 4,098.62 grammes.
" Nitrogen " .... 440.93 grains.
" " " .... 28.569 grammes.

TABLE C(3).

Analyses of Excretions.—Urine and Fæces.

Third Period—Five Days after the Walk.

(French weights in parentheses.)

URINE.	1st Day, Nov. 26.	2d Day, Nov. 27.	3d Day, Nov. 28.	4th Day, Nov. 29.	5th Day, Nov. 30.	Averages.
Quantity	31.59 fl. oz. (937.5 c. c.)	46.14 fl. oz. (1,365.0 c. c.)	84.18 fl. oz. (2,490.0 c. c.)	60.38 fl. oz. (1,786.0 c. c.)	68.39 fl. oz. (2,023.0 c. c.)	58.14 fl. oz. (1,720.3 c. c.)
Specific gravity	1025.8	1024.4	1019.7	1022.5	1022.6	1023.0
Urea	593.23 grains (38.437)	716.29 grains (46.410)	768.61 grains (49.800)	744.32 grains (48.226)	811.48 grains (52.598)	726.79 grains (47.094)
Nitrogen in urea	276.84 " (17.937)	334.27 " (21.658)	358.68 " (23.240)	347.35 " (22.505)	378.69 " (24.546)	339.17 " (21.977)
Uric acid	0.48 " (0.031)	0.52 " (0.034)	0.31 " (0.020)	2.51 " (0.163)	3.30 " (0.214)	1.42 " (0.082)
Phosphoric acid	29.06 " (1.883)	46.93 " (3.041)	105.68 " (6.847)	50.76 " (3.289)	52.00 " (3.364)	56.89 " (3.674)
Sulphuric acid	49.53 " (3.209)	46.07 " (2.985)	53.57 " (3.471)	48.73 " (3.157)	47.20 " (3.058)	49.02 " (3.176)
Chloride of sodium	66.41 " (4.303)	170.64 " (11.056)	622.58 " (40.338)	297.70 " (19.288)	404.65 " (26.218)	312.40 " (20.241)
Abnormal matters	Small amount of oxalate of lime (octahedra), with amorph. urates.	Trace of sugar; small amount of oxalate; uric-acid crystals.	Same as on Nov. 27th.	No abnormal matters.	Moderate amount of oxalate.	
FÆCES.						
Quantity	3.51 oz. (99.5)	4.57 oz. (129.5)	9.53 oz. (270.0)	6.61 oz. (187.5)	7.41 oz. (210.0)	6.33 oz. (179.3)
Nitrogen in fæces	18.86 grains (1.222)	24.54 grains (1.590)	51.19 grains (3.316)	35.54 grains (2.303)	39.80 grains (2.579)	33.99 grains (2.202)
Nitrogen in urea and fæces combined	295.70 grains (19.159)	358.81 grains (23.248)	409.87 grains (26.556)	382.89 grains (24.808)	418.49 grains (27.125)	373.15 grains (24.179)
Nitrogen of urea & fæces per 100 pts. N. of food.	76.68	71.81	103.81	59.67	147.69	91.93
Uric acid per 100 pts. of urea	0.081	0.072	0.040	0.337	0.406	0.187

The fæces contained an average of 72 per cent. of water.

Table D.

Daily Averages for the Three Periods.

(French weights and measures in parentheses.)

	First Period—Five Days before the Walk.	Second Period—Five Days of the Walk.	Third Period—Five Days after the Walk.
Weight	Loss in 5 days—21.8 oz. (593 gr.)	Loss in 5 days—55.2 oz. (1,565 gr.) Loss in 4 days—83.2 oz. (2,358 gr.)	Gain in 5 days—80 oz. (2,268 gr.)
	Average of 5 days—	Average of 5 days—	Average of 5 days—
Temperature	99° Fahr. (37.2° C.)	96.3° Fahr. (35.7° C.)	98.6° Fahr. (37° C.)
Pulse	78	90	74
Respirations	22	21	23
Sleep	8 h. 5 m.	3 h. 17 m.	8 h. 29 m.
Miles walked	8.2 miles	63.5 miles	2.2 miles
Ingesta	100.50 oz. (2,848.82 gr.)	171.47 oz. (4,860.57 gr.)	144.59 oz. (4,098.62 gr.)
Nitrogen of food	339.46 grains (21.994)	234.76 grains (13.211)	440.93 grains (28.569)
Cutaneous and pulmonary exhalation	61.63 oz. (1,690.91 gr.)	138.41 oz. (3,875.18 gr.)	62.82 oz. (1,706.78 gr.)
Urine.			
Quantity	37.84 fl. oz. (1,134.0 c. c.)	38.46 fl. oz. (1,138.0 c. c.)	58.14 fl. oz. (1,720.3 c. c.)
Specific gravity	1024.9	1028.7	1023.0
Urea	628.24 grains (40.705)	722.16 grains (46.803)	726.79 grains (47.094)
Nitrogen in urea	293.18 " (18.729)	337.01 " (21.841)	339.17 " (21.977)
Uric acid	2.26 " (0.127)	3.00 " (0.194)	1.42 " (0.082)
Phosphoric acid	50.14 " (3.262)	76.63 " (4.965)	56.89 " (3.674)
Sulphuric acid	41.57 " (2.693)	53.50 " (3.666)	49.02 " (3.176)
Chloride of sodium	159.45 " (10.331)	65.08 " (4.217)	312.40 " (20.241)
Fæces.			
Quantity	4.08 oz. (115.6)	4.53 oz. (128.3)	6.33 oz. (179.3)
Nitrogen	21.91 grains (1.421)	24.32 grains (1.576)	33.99 grains (2.202)
Nitrogen in urea and fæces combined	315.09 grains (20.149)	361.52 grains (23.217)	373.15 grains (24.179)
Nitrogen of urea and fæces per 100 pts. of Nitrogen of food	95.53 parts	174.81 parts	91.93 parts
Uric acid per 100 pts. of urea	0.362 parts	0.409 parts	0.187 parts

Table E.

Meteorological Observations, taken at the Cooper Union, New York City,

BY PROF. ORAN W. MORRIS.

1870. MONTH AND DAY.		BAROMETER. Daily Readings corrected and reduced to 32° Fahr.			THERMOMETER. (Fahrenheit.) Self-registering.			Highest in the sun.	Degree of Humidity. Saturation represented by 100.	WIND. General Direction.		SKY AND ATMOSPHERE.
		High-est.	Low-est.	Mean.	High-est.	Low-est.	Range.			A. M.	P. M.	
Nov.	Date.	in.	in.	in.	°	°	°	°	°			
Wed'day	16	30.065	29.817	29.911	46.0	35.0	11.0	82.0	40.60	NW	S W	Clear.
Thursday	17	30.146	30.059	30.099	47.0	37.0	10.0	78.0	43.16	W	W	Light clouds.
Friday	18	29.931	29.857	29.895	42.0	29.0	13.0	42.5	61.36	S W	W	Slight r'in & slight snow 6.15 P. M.
Saturday	19	29.907	29.735	29.827	36.0	27.0	9.0	42.0	56.66	W	W	Snow sq'lls. Clear eve.
Sunday	20	29.950	29.932	29.942	43.0	33.0	10.0	74.0	43.20	W	S W	Clear A. M. Cloudy eve
Monday	21	30.167	29.954	30.029	50.0	38.0	12.0	60.0	44.70	S W	W	Cloudy.
Tuesday	22	30.174	29.623	29.913	48.0	39.8	9.0	48.5	73.70	N E	N E	Rain all day. Gale eve.
Wed'day	23	29.763	29.547	29.624	50.0	36.0	14.0	72.0	51.30	S W	W	Light cl'ds.
Thursday	24	29.892	29.832	29.861	44.0	33.0	11.0	77.0	43.46	W	W	Flying cl'ds.
Friday	25	30.044	29.745	29.879	49.0	39.0	10.0	79.3	48.83	W	S W	Clear A. M. Cl'dy & rain 10.15 P. M.
Saturday	26	29.715	29.477	29.569	50.0	40.0	10.0	82.0	63.13	NW	NW	Rain A. M. Light cl'ds.
Sunday	27	29.914	29.803	29.846	58.0	42.0	16.0	89.0	46.40	W	NW	Clear. 2 meteors eve.
Monday	28	30.067	30.054	30.060	58.0	44.0	14.0	90.0	48.90	NW	S W	Light cl'ds.
Tuesday	29	30.033	29.811	29.949	62.0	38.0	24.0	88.5	60.76	S W	NW	Light cl'ds. Slight rain evening.
Wed'day	30	30.277	30.181	30.221	46.0	34.0	12.0	80.0	46.43	NW	S E	Light cl'ds. Clear eve.

The height of the cistern of the barometer is considered to be 46 feet above tide-water.
A severe gale N. E., and very high tide, on the 22d.

PART II.

Physiological Deductions from the Observations taken before, during, and after the Walk of 317½ Miles in Five Consecutive Days.

The data obtained during the three periods, five days before, five days during, and five days after this remarkable walk, will enable me to come to very definite conclusions with regard to certain physiological questions of interest, particularly the influence of muscular exercise upon the elimination of nitrogen. With regard to the influence of this excessive and prolonged exertion upon the weight of the body, temperature, circulation, respiration, nervous system, etc., the information is necessarily more incomplete and indefinite. I shall, however, endeavor to make use of all of the facts that were noted; though the main object was to study the relations of the nitrogen.

The phenomena observed relate to the weight of the body, and the temperature, pulse, and respirations, in so far as these conditions were modified by the amount of exercise and sleep. Having taken daily the weights of the ingesta, the excretions by the kidneys and intestines, and the weight of the body, it was possible to calculate with tolerable accuracy the amount of exhalation from the lungs and skin.

Weight of the Body.

It is well known that, by regulating the diet and exercise, the weight may be modified within certain limits; and the system of training employed by athletes is supposed to develop to the highest possible extent the muscular power and endurance. The principle in training is, in brief, to regulate the daily exercise, so that gradually the system is worked daily as much as can be endured without exhaustion; and to restrict the diet to rare, lean meats, stale bread, and nitrogenized articles, eliminating fatty matters and reducing the starchy principles to the minimum. By this process, the weight is reduced (for professional athletes out of training are generally over-weight), the muscles are hardened, nearly all the fat disappears, and the power and, within limits, the endurance,

are developed to the maximum. In the case of Mr. Weston, no rigid system of training was adopted; but the variations in weight are interesting, in view of the great variations in his diet during the three periods and the immense differences in the amount of exercise taken.

When the investigations were begun, at midnight, November 15th, the weight was 120.5 lbs. (54 k. 655 grammes). At the end of the five days it had been reduced to 119.2 lbs. (54 k. 62 grammes). The lightest weight during this period was on the fourth day, when it was 118.5 lbs. (53 k. 745 grammes). On the second day, the weight increased to 121.25 lbs. (55 kilos.).

First Period, Five Days before the Walk.—On the first day, the weight being unchanged, Mr. Weston walked fifteen miles; he took 122.99 oz. (3,492.17 grammes) of food and drink, containing 361.22 grains (23.404 grammes) of nitrogen. He discharged 44.20 oz. (1,303.08 grammes) in the urine and fæces, and 78.79 oz. (2,189.09 grammes) by the lungs and skin. The weather was clear and dry, the temperature ranging from 35° to 46° Fahr. Assuming the usual quantity of food and drink for an ordinary man to be about 90 oz. (about 2,542 grammes), containing about 310 grains (20 grammes) of nitrogen,[1] rather an excess was taken on this day. The cutaneous exhalation was excessive. Allowing 20 oz. (567 grammes) for pulmonary exhalation, which is tolerably constant, the cutaneous exhalation amounted to 58.70 oz. (1,658.27 grammes), the normal amount being about 30 oz. (850 grammes).[2]

On the second day, there was a diminution in the total quantity of food and drink and in the amount of nitrogen (total food and drink, 105.43 oz. [2,987.92 grammes]; nitrogen, 288.35 grains [18.682 grammes]), with an increase in weight of 12 oz. (345 grammes), the urine and fæces being diminished about 0.5 oz. (15.13 grammes), and the cutaneous exhalation about 29 oz. (834.12 grammes). The weather was a little warmer, but cloudy and damp. The only explanation

[1] Flint, Jr., *Physiology of Man*, New York, 1867, vol. ii., Alimentation, p. 124.

[2] Id., 1866, vol. i., Respiration, p. 447; and, Id., 1870, vol. iii., Secretion, p. 139.

I can offer for this increase in weight is in the small amount of exercise, which was only five miles.

On the third day, there was a loss of weight amounting to 20 oz. (567 grammes). On this day, there was a further diminution in the quantity of food and drink and in the amount of nitrogen (total food and drink, 86.56 oz. [2,453.67 grammes]; nitrogen 272.27 grains [17.641 grammes]). The urine and fæces were increased about 8.25 oz. (243.58 grammes), and the cutaneous exhalation, 4.88 oz. (142.17 grammes). The exercise was five miles, the same as on the second day.

On the fourth day, the weight was diminished 24 oz. (687 grammes). The total amount of food was about the same as on the third day (86.19 oz.—2,443.19 grammes). The nitrogen was increased by about 63 grains (4.065 grammes). The urine and fæces were diminished by about 15.5 oz. (455.03 grammes), and the cutaneous exhalation was increased by about 19 oz. (549.55 grammes). The exercise on this day was fifteen miles which, with the diminished ingesta, will account for the loss in weight.

On the fifth day, there was a gain in weight of about 11 oz. (317 grammes). The total quantity of food and drink was increased over the amount on the fourth day by about 15 oz. (429.44 grammes). The nitrogen was increased by over 105 grains (6.830 grammes). The urine and fæces were about the same as on the fourth day. The cutaneous exhalation was diminished by 22.27 oz. (680.02 grammes). The exercise on this day was only one mile. The increase in weight is only to be explained by the want of exercise and the large quantity of solid food taken.

Second Period, Five Days of the Walk.—This period presents the greatest interest, as regards the influence of the diet and exercise upon the weight of the body.

On the first day, walking eighty miles and sleeping but one hour, the loss of weight was about 45 oz. (1,224.00 grammes). The quantity of food and drink was increased over the amount on the day before by about 85 oz. (2,409.75 grammes), the increase being chiefly in liquids. The nitrogen was diminished by 289 grains (18,716 grammes). The fæces were but slightly increased. The urine was increased by about 8 oz

(195 c.c.). The estimated cutaneous exhalation was increased by 130 oz. (3,723.11 grammes), a little more than two and a half times. The loss in weight was undoubtedly due, in great measure, to the extraordinary amount of exercise. I will endeavor to explain this more fully when I compare the weights for the three periods.

On the second day, walking forty-eight miles and sleeping 4 hours and 28 minutes, there was a further loss of 4 oz. (114 grammes). The quantity of food and drink was diminished by about 21 oz. (582.25 grammes), but the nitrogen was increased by about 114 grains (7.409 grammes). The fæces were increased by a little more than 3 oz. (89 grammes). The urine was diminished by about 8.5 oz. (254 c.c.). The cutaneous exhalation was diminished by 54 oz. (1,521.38 grammes). The loss of weight I shall endeavor to explain further on.

On the third day, walking ninety-two miles and sleeping but thirty minutes, the loss of weight was estimated at 20 oz. (567 grammes). The weight was not accurately taken on this day, and was averaged.

On the fourth day, walking fifty-seven miles and sleeping one hour, the weight was 36 oz. (1,020.00 grammes) less than on the *second* day. (This represents the loss for two days.) The food and drink were, for the *third* day, about 5 oz. (151.09 grammes) more than for the *second* day, and for the *fourth* day, about 22 oz. (625.61 grammes) less than for the *third* day. On the *third* day, the nitrogen was diminished by about 37 grains (2.417 grammes). On the *fourth* day, the nitrogen was further diminished by 84 grains (5.436 grammes). There were no fæces on the *third* day, and the urine was increased by about 7 oz. (209 c.c.). On the *fourth* day, the fæces were about in average quantity. The urine was diminished about 8 oz. (235 c.c.). On the *third* day, the cutaneous exhalation was increased by about 22 oz. (610.82 grammes). On the *fourth* day, the cutaneous exhalation was diminished by about 23 oz. (636.67 grammes). I shall discuss the loss of weight in connection with a comparison of the three periods.

On the fifth day, walking forty and a half miles, and sleeping 9 hours and 26 minutes, there was an increase in weight of 28 oz. (793.00 grammes). The food and drink were in-

creased by 36 oz. (1,020.48 grammes). The nitrogen was increased by 239 grains (15.442 grammes), about two and two-thirds times. The fæces were diminished 0.16 oz. (4.50 grammes), and the urine was increased, about 11 oz. (325 c.c.). The cutaneous exhalation was diminished about 19 oz. (546.61 grammes).

The loss of weight during this period of extraordinary muscular exertion is a most interesting question; and it will be considered in connection with, not only the amount of food, drink, excretions, and exhalations, but the quantities of nitrogen introduced and discharged.

Third Period, Five Days after the Walk.—It is to be remembered that this period was one of nearly absolute repose, after the immense exertion of the preceding five days, with a daily average of eight and a half hours of sleep.

On the first day, the weight increased by 36 oz. (1,021.00 grammes). The weight of food and drink was diminished by about 55 oz. (1,662.46 grammes), but the amount of nitrogen was about the same as on the fifth day of the second period. The fæces were diminished by 1.36 oz. (38.50 grammes), and the urine, by about 12 oz. (352.50 c.c.). The cutaneous exhalation was diminished by nearly 50 oz. (1,394.50 grammes). The increase in weight was probably due in most part to retention of liquids and appropriation of nitrogenized matter to supply the muscular waste that had been going on for the previous five days. For the five days of the walk, for every 100 parts of nitrogen of food, there was a discharge of 174.81 parts in the urine and fæces. On this, the first day, the discharge of nitrogen was in the proportion of 76.68 parts per 100 parts in the food.

On the second day, there was a further gain in weight of 36 oz. (1,021.00 grammes), which brought the weight to 120.25 lbs. (54 k. 539 grammes), about the standard at the very commencement of the observations, which was 120.5 lbs. (54 k. 655 grammes). The weight of food and drink was increased by 50.66 oz. (1,436.03 grammes), and the nitrogen was increased by about 113 grains (7.351 grammes). The fæces were increased about 1 oz. (28.35 grammes), and the urine about 14.5 oz. (427.15 c. c.). The cutaneous exhalation was increased about

34 oz. (969.41 grammes). This day was warm, clear, and dry, the first day being rainy, and from 5° to 8° Fahr. colder.

On the third day, the weight was unchanged. The food and drink were diminished by 59 oz. (1,670.17 grammes), and the nitrogen, about 104 grains (6.756 grammes). The fæces were increased by 5 oz. (140.5 grammes), a little more than doubled. The urine was increased by 38 oz. (1,125 c.c.), nearly doubled. The cutaneous exhalation was diminished by about 66.5 oz. (1,930.61 grammes), more than three times. This day shows a working off by the urine and fæces of the unusual amount of food, and especially nitrogenized matter, taken on the previous day, the weight remaining stationary.

On the fourth day, the weight was increased 52 oz. (1,474.00 grammes). This great increase is explained by the following circumstance: At 11.15 P. M. Mr. Weston took supper, the food and drink weighing 54.75 oz. (1,547.36 grammes). The weight of the body was taken at 11.55 P. M., about the usual hour. This was the only time when any thing was eaten after 7.45 P. M. This accident renders it useless to discuss the question of weight on this day. On this day, the nitrogen of the food was enormously increased, amounting to 641.71 grains (41,578 grammes); the average for an ordinary man being about 310 grains (20 grammes).

On the fifth day the weight was about the same as on the *third* day; the increase being only 0.5 lbs. (226 grammes). On this, the final day of the observations, the weight was about the same as on the first day of the first period, being increased only a quarter of a pound. The food and drink were diminished about 85 oz. (2,419.09 grammes), and the nitrogen about 358.5 grains (23,219 grammes). The fæces were increased about 1 oz. (22.5 grammes), and the urine 8 oz. (237 c.c.). The cutaneous exhalation was increased about 1.68 oz. (37.87 grammes.)

Causes of the Variations in Weight.[1]—In a measure, the variations in weight during the fifteen days may be satisfactorily explained; but there are certain questions involved that are as yet obscure. The explanation of the variations during

[1] To avoid complicating the discussion of the causes of the variations in weight, the English weights only will be used.

the walk, and for the five days after, is much facilitated by a comparison of the ingress and egress of nitrogen.

At the outset of the investigations, the weight was 120.5 lbs., which Mr. Weston thought was about normal. During the period of five days before the walk, the variations were not very great, the highest being 12 oz. above, and the lowest 32 oz. below. At the end of the fifth day, the weight was reduced by about 21 oz. On the first day, the weight being unchanged, the exercise was fifteen miles. The food was of the ordinary variety, but its quantity and proportion of nitrogen were about 30 per cent. above the average for an ordinary man. On the second day, the diminished exercise, the food being less, but still above the normal average, will account for the increase in weight of 12 oz. On the third day, the exercise was the same as on the second day, but the food was reduced a little below the normal average, which will account for 20 oz. loss of weight. On the fourth day, the food was still below the average, being about the same as on the previous day, but it contained a large proportion of nitrogenized matter, over 20 per cent. more than on the third day. The exercise was fifteen miles, which, with the diet, will account for 24 oz. loss of weight. On the fifth day, the food was increased to a little above the average, and it contained an immense amount of nitrogen, about 35 per cent. above the average. This fact, with the absolute muscular repose and ten hours' sleep, as a preparation for the walk, will readily account for 11 oz. increase in weight. During this period of five days before the walk, the average quantity of food and drink was 100.5 oz., containing 339.46 grains of nitrogen, the ordinary average being 90 oz., containing 310 grains of nitrogen. The average discharge of nitrogen by the urine and fæces was 95.53 parts per 100 parts of the nitrogen of food; which is about normal. It is thus evident that the variations in weight during a period of five days of ordinary life can be readily explained in accordance with generally-accepted physiological principles.

In endeavoring to explain the variations in weight that occurred during the walk, and for the succeeding five days, the extraordinary amount of muscular exertion introduces new

elements to be considered. These have a most important bearing upon the subject of nutrition, disassimilation, and "the source of muscular power," about which so much has been written within the past few years.

First: What tissue was consumed, the products being thrown off, during the effort of walking 317½ miles in five consecutive days? Was it the muscular substance? The importance, as regards our ideas of nutrition, of a positive and definite answer to this question can hardly be overestimated.

The loss of weight was undoubtedly due in a great measure to the excessive muscular exertion; but in part, also, to change in diet. This proposition does not demand discussion.

The loss must have been either in liquids, fats, or muscular substance.

It is not probable that the loss was due, to any great extent, to a diminution in the proportion of liquids, for the excessive loss from the skin was instantly supplied by liquids taken into the stomach. It is not necessary to cite experiments which show that loss by the skin, as it occurs in hot-air or vapor-baths, or in working for an hour or more at a high temperature, is readily compensated by liquid ingesta, as this fact is well settled in physiology.[1] A glance at the daily tables of food and drink will show that, during the five days of the walk, Mr. Weston took from 8 lbs. 8 oz. to 10 lbs. 11 oz. of liquids.

If the loss were due to a consumption of non-nitrogenized matters, it would be chiefly of fat and would be represented by the carbonic acid of expiration. It is certain that the non-nitrogenized constituents of the body do not contribute to the formation of the nitrogenized excrementitious matters.

If the loss were due to a consumption of the nitrogenized elements of the body, principally of the muscular tissue, this loss, under the extraordinary muscular effort, would be represented by the nitrogen of the excretions. It is not probable that the nitrogenized constituents of the body are, in any considerable amount, changed into non-nitrogenized matter and exhaled under the form of carbonic acid, though this may occur to a slight extent.

[1] See my work on Physiology, New York, 1870, vol. iii., p. 140, *et seq.*

The question then resolves itself to that of the relative consumption and elimination of nitrogenized matters. The following are the facts on this point, observed during the five days of the walk:

During the five days of the walk[1] Mr. Weston consumed in all, 1,173.80 grains (76.055 grammes) of nitrogen in his food. During the same period, he eliminated 1,807.60 grains (116.084 grammes) of nitrogen in the urine and fæces. This leaves 633.80 grains (40.030 grammes) of nitrogen, over and above the nitrogen of the food, which must be attributed to the waste of his tissues, and probably almost exclusively to the waste of his muscular tissue. According to the best authorities, lean meat, uncooked, or muscular tissue, contains 3 per cent. of nitrogen.[2] The loss of 633.80 grains (40.030 grammes) of nitrogen, would then represent a loss of 21,127.00 grains (1,334.33 grammes), or 3.018 lbs. of muscular tissue. The actual loss of weight was 3.450 lbs. (1,565.00 grammes). This allows about 0.43 lb. (230.67 grammes) loss unaccounted for, which might be fat or water.

The correspondence of these figures of loss calculated from the amount of nitrogen eliminated with the actual loss in weight leaves no room for doubt with regard to the fact that the immense exertion during this period of five days was attended with consumption of the muscular substance. Those who have adopted the view that the muscular system is like a steam-engine, consuming in its work food as fuel and not its own substance, may say that this is an extraordinary case, as it undoubtedly is; but the facts developed by the foregoing observations prove, none the less conclusively, that the muscular system may consume its own substance by exercise, even when the individual takes all the food required by his appetite. It can hardly be, however, that the foregoing facts are not in accordance with a general physiological law.

It will be interesting, now, to study the behavior of the system after the walk, when there was almost absolute repose,

[1] I have reduced these calculations, on account of their great importance, to grammes.

[2] PAYEN, *Précis théorique et pratique des substances alimentaires*, Paris, 1865, p. 488.

and when the quantity of nitrogen taken with the food was largely increased. The important question here is the following:

In the return of the weight to the normal standard, did the muscular tissue take up nitrogen to repair the excessive waste engendered by the five days of exertion?

In two days after the walk, the weight had increased to within four ounces of the standard at the beginning of the observations, five days before the walk. It is not to be expected that this increase would be due entirely to appropriation of nitrogenized matter by the muscular system. Reference to the tables of diet for these two days shows that the food taken was about 155 oz. each day, the normal average being assumed at 90 oz., an excess of a little more than 70 per cent. The nitrogen taken was about 50 per cent. in excess of the normal amount. The tables also show a large proportion of non-nitrogenized matter in the food on those days. The exercise was only two miles daily. Mr. Weston gained in weight 4.5 lbs. He retained in his system an amount of nitrogen equivalent to 1.1 lb. In view of the muscular inactivity and the large proportion of non-nitrogenized matter in the food, it is fair to assume that the remaining 3.4 lbs. was due to accumulation of fat. This, however, is a point incapable of positive demonstration. Taking the entire period of five days after the walk, the gain in weight was five pounds, which brought it 4 oz. above the weight at the beginning of the fifteen days. The excess of the nitrogen of food over the nitrogen of the urine and fæces represented, for these five days, an accumulation of 1.6 lb. of muscular substance. During this time there was almost complete repose of the muscular system. The daily quantity of food was about 61 per cent. over the normal average, and the nitrogen, about 42 per cent. over the average. The food contained, also, a large proportion of non-nitrogenized matter.

These facts seem to indicate that, after the immense effort in walking 317½ miles in five consecutive days, for five days of muscular inactivity, the quantity of food being large and containing a greater proportion of non-nitrogenized matter than the food taken either before or during the walk, the mus-

cular system appropriated 1.6 lb. of nitrogenized matter, and the entire body accumulated about 3.4 lbs. of fat. It is well known that athletes, after a season of severe training by exercise and nitrogenized diet, accumulate fat very rapidly, when the muscles are allowed repose and the diet is unrestricted.

Temperature, Pulse, and Respirations.

The temperature under the tongue for every day during the three periods was carefully taken, as nearly as possible at the same hour and under the same conditions. During the five days of the walk, the temperature was taken after the day's walk had been accomplished; and during the five days before and the five days after the walk, it was taken generally between 10.45 P. M. and midnight.

First Period, Five Days before the Walk. — The temperatures for each day do not present any great range of variation. The data here are chiefly useful as indicating the normal average under ordinary conditions. The highest temperature was at the end of the first day. It was then 99.7° Fahr. (37.6° C.). The lowest temperature was on the third day, when it was 98° Fahr. (36.7° C.). On the first day, the quantity of food and drink and the proportion of nitrogen were above the average, by about 20 per cent. The exercise was fifteen miles. On the third day, the quantity of food and drink was a very little below the average, and less nitrogen was taken than on any of the five days. The exercise was five miles. On the fifth day, the temperature was within 0.2° Fahr. of the temperature on the first day. On this day the quantity of food and drink was slightly above the average, but the nitrogen of the food was increased 42 per cent. The exercise was only one mile. On the first day, the weather was clear, the highest temperature in the shade was 46°, and the lowest, 35° Fahr. On the fifth day, it was also clear, and the highest temperature was 43°, and the lowest, 30° Fahr. On the third day, the meteorological record was, "slight rain and slight snow 6.15 P. M.," highest temperature 42°, and lowest 29° Fahr. On the fourth day, when the temperature under the tongue was 99.1° Fahr. (37.3° C.), the external temperature was 36°, highest, and 27°, lowest, "snow-squalls, clear

evening." On this day, the total amount of food and drink was the same as on the third day, but the nitrogen of the food was increased by about 23 per cent. The exercise was fifteen miles, on the fourth day. On the second day, when the temperature under the tongue was 98.4° Fahr. (36.9° C.), the nitrogen of the food was only 16.08 grains more than on the third day. The weather was cloudy, the highest temperature, 47°, and the lowest, 37° Fahr.

In the range of temperature during the five days of this period, there does not seem to be any marked difference due to the exercise. The variations apparently bear some relation to the amount of nitrogenized food, the temperature being high when the nitrogen of the food is abundant, and low when the proportion is small. The temperature was markedly higher on the clear days, without any definite relation to the external temperature.

The range of temperature for these five days was about normal, from 98° to 99.7° Fahr. (36.7° to 37.6° C.). In my work on physiology, I have taken, as the standard temperature under the tongue, 98° Fahr., subject to variation within the limits of health of about 0.5° below and 1.5° above.[1]

The average temperature for the first period of five days before the walk, which I shall take as the standard for comparison with the temperatures at the other periods, is 99° Fahr. (37.2° C.).

Second Period, Five Days of the Walk.—The variations in temperature during this period are remarkable, and highly interesting from their possible physiological relations. By reference to the meteorological table (E.), it will be seen that the weather during this period was generally cloudy, without much variation from day to day in the thermometer. There does not appear to be any constant relation, during this period, between the temperature and the daily consumption of nitrogen.

On the first day, between 12.15 A. M. and 10.32½ P. M. Mr. Weston walked eighty miles. His temperature was taken

[1] FLINT, Jr., *Physiology of Man*, New York, 1870, vol. iii., Nutrition, p. 396.

eight minutes after he had completed the walk, and was 95.3° Fahr. (35.3° C.), 4.3° less than the last temperature taken before the walk was begun. This is an immense reduction, greater than ever occurs under the ordinary conditions of health, and can be attributed only to the extraordinary muscular exertion during the day.

On the second day, between 4.58 A. M. and 4.5 P. M., Mr. Weston walked forty miles, when he stopped for 6 hours and 19 minutes. At 10 P. M., about six hours after the stop, the temperature was 94.8° Fahr. (34.9° C.), a reduction from the temperature of the first day of 0.5°. Mr. Weston did not sleep well, as he had hoped to do during the six hours. At 10.24 P. M., he began his first effort to walk one hundred and twelve miles in twenty-four consecutive hours. I now think the further lowering in the temperature was an indication of want of proper reaction after the walks he had already accomplished. Had I appreciated the facts at that time, I would have advised him to have deferred his first attempt to accomplish the hundred and twelve miles until a later period. As it was, the attempt was a failure.

As on the first day, the lowering in temperature is only to be attributed to the excessive and prolonged muscular exertion.

On the third day, between midnight of the second day and 10.52 P. M., Mr. Weston walked ninety-two miles. At 11.15 P. M. the temperature was 96.6° Fahr. (35.9° C.), 1.8° higher than on the second day.

On the fourth day, Mr. Weston walked fifty-seven miles between 1.33 A. M. and 10.30 P. M. The temperature, taken at 10.40 P. M., was 96.6° Fahr. (35.9° C.), the same as on the third day. This was the day on which the walk was interrupted by nervous prostration.

On the fifth day, Mr. Weston walked forty and a half miles, between 9.56 A. M. and midnight. He continued walking for fifteen minutes after midnight. He was in fine spirits all day. During this twenty-four hours, for the first time, he got sufficient refreshing sleep. He slept nine hours and twenty-six minutes. The temperature, taken at 1.30 A. M. of the next day, was 97.9° Fahr. (36.6° C.); an increase of 1.3° over the temperature of the day before.

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It is difficult to explain satisfactorily the elevation of temperature by 1.8° on the third day, the day of the longest walk, and the same temperature on the fourth day, when Mr. Weston broke down completely. The temperature, however, on these days was still 2.4° below the average of the five days before the walk, and 2° below the average of the five days after the walk. The elevation of temperature on the fifth day, by 1.3°, was probably on account of the sleep of nine hours and twenty-six minutes.

The average temperature during this period was 96.3° Fahr. (35.7° C.); 2.7° below the average of five days before, and 2.3° below the average of five days after the walk. The tolerably uniform depression of temperature during this period of excessive exertion shows pretty conclusively that severe and prolonged muscular exercise diminishes the heat of the body. It has been observed that during, or immediately after moderate exercise, the heat of the body is increased, and that the actual temperature of the muscles is sensibly elevated;[1] but this is very different from the immense muscular and nervous strain to which Mr. Weston subjected himself for five days. The fact of diminution of temperature during this period remains, without any explanation, except that it was probably due to some unusual condition of the nervous system.

Third Period, Five Days after the Walk.—During this period, there was but little variation in the temperature from day to day. On the first day, the temperature was 98.6° Fahr. (37° C.); 0.7° higher than on the last day of the walk. This temperature was about normal. On the second day, the temperature was 98.4° Fahr. (36.9° C.); on the third day, 99.3° Fahr. (37.4 C.); on the fourth day, 98.8° Fahr. (37.1° C.); and on the fifth day, 97.5° Fahr. (36.4° C.). This range of temperature was about normal, assuming, as I have done, that the average is 98° Fahr., with a range of 0.5° below and 1.5° above. The average temperature for the five days was 98.6 Fahr. (37° C.), 0.4° less than the average for the five

[1] For an account of different observations on this point, see my work on Physiology, New York, 1870, vol. iii, Nutrition, p. 413.

days before the walk, and 2.3° more than the average for the five days of the walk.

In studying the variations in temperature from day to day during this period, I have not been able to establish any definite relation with the food or with the meteorological record. The difference between the average during this period and the average for the five days before the walk is insignificant. It is interesting to note, however, that as soon as the extraordinary muscular effort ceased, the temperature returned to about the normal standard.

Pulse and Respirations.—During the first period, there was very little variation in either the pulse or respirations. The extremes for the pulse were 93 and 71. The pulse was 93 just before the walk, and this was undoubtedly due to the excitement incident to the commencement of the trial. At that time, also, the respirations were 25. For the first three days, the respirations were 20, and on the fourth day, 23.

During the five days of the walk, the pulse ranged from 68 to 109. The pulse was 109 on the third day, when the exercise was ninety-two miles. The range of the respirations was from 18 to 23. On the fourth day, after Mr. Weston had completely broken down in his walk, the pulse was 68, and the respirations, 18.

For the five after the walk, the range of the pulse was from 70 to 78, and the respirations were from 22 to 24.

The averages for the five days before the walk were, for the pulse, 78, respirations, 22; for the five days of the walk, pulse 90, respirations, 21; and for the five days after the walk, pulse 74, respirations, 23.

In the absence of sphygmographic records of the pulse, there could be very little learned from the observations on the circulation. The variations in the respirations, also, convey very little information. It was impossible, however, to make the records on these points more elaborate; and as it was necessary to make all of the observations without subjecting Mr. Weston to any considerable annoyance or loss of time, experiments with the sphygmograph would have been impracticable.

The records with regard to sleep, exercise, quantity of food and drink, and the composition of the food, were made to be used in connection with the question of the elimination of nitrogen, and will not, therefore, be discussed separately. The cutaneous and pulmonary exhalations were calculated from the weight of ingesta, urine, and fæces, and the variations in the weight of the body. As these were not directly estimated, they will not be discussed under distinct heads.

Variations in the Urine due to Exercise, studied in connection with the Proportion of Nitrogen in the Food.

In discussing the variations in the urine during the three periods into which the investigations were divided, I shall take up first the quantity; then the urea, or the amount of nitrogen eliminated in the urea, in connection with the nitrogen of the fæces, and compare the total elimination of nitrogen with the quantity introduced with the food; then the uric acid and its relations to the urea; and, finally, the inorganic salts and abnormal matters.

Quantity of Urine.

The most important point to determine in this connection is whether the immense amount of exercise during the five days of the walk had any influence upon the elimination of water by the kidneys. This can be settled with tolerable accuracy, inasmuch as the liquids taken each day were carefully measured.

First Period, Five Days before the Walk.—The range of variation in the quantity of urine during this period was not great, the extremes being 32.45 fl ℥ (960 c. c.), and 46.15 fl ℥ (1,365 c. c.). The variations do not present any definite relation to the quantity of liquids. On the fourth day, with 32.45 fl ℥ of urine, the liquids taken amounted to 68.73 fl ℥. On the third day, with 46.15 fl ℥ of urine, the liquids taken amounted to 55.56 fl ℥. On the third day, when the quantity of urine was the greatest, the meteorological record is the following: Thermometer, highest, 42° Fahr., lowest, 29° Fahr.; humidity (saturation 100) 61.36; "slight rain and slight snow at 6.15, P. M." The humidity on that day was the greatest of

the five. On the fourth day, when the quantity of urine was the least, the record was as follows: Thermometer, highest, 36° Fahr., lowest, 27° Fahr.; humidity 56.66; "snow-squalls, clear evening." During this period, the excess of liquids taken must have been discharged through the skin.

The average quantity of urine during these five days was 37.84 fl ℥ (1,134 c. c.). The average quantity of liquids taken daily was 65.56 fl ℥ (1,966.8 c. c.).

Second Period, Five Days of the Walk.—The range of variation in the quantity of urine during this period was also slight, the extremes being 43.60 fl ℥ (1,290 c. c.), on the fifth day, and 32.52 fl ℥ (965 c. c.), on the fourth day. The variations bore no definite relation to the meteorological record. On the day of greatest discharge of urine, the liquids taken amounted to 151.06 fl ℥. On the day of the least urine, the liquids taken amounted to 137.04 fl ℥. During this period, the relations between the quantity of urine and of liquids taken were pretty constant: first day, urine, 42.09 fl ℥, liquids taken, 171.67 fl ℥; second day, urine, 33.50 fl ℥, liquids taken, 136.40 fl ℥; third day, urine, 40.56 fl ℥, liquids taken, 158.75 fl ℥; fourth day, urine, 32.52 fl ℥, liquids taken, 137.04 fl ℥; fifth day, urine, 43.60 fl ℥, liquids taken, 151.06 fl ℥.

The average quantity of urine during these five days was 38.46 fl ℥ (1,138 c. c.). The average quantity of liquids taken was 150.40 fl ℥ (4,512 c. c.).

The average of 38.46 fl ℥ (1,138 c. c.) for the five days of the walk, against 38.14 fl ℥ (1,134 c. c.), for the five days before the walk, shows conclusively that the walk of 317½ miles in five days did not affect the quantity of urine; and that the immense amount of liquids taken during that time must have been discharged by the skin.

Third Period, Five Days after the Walk.—The variations in the daily discharge of urine during this period were very considerable, the extremes being 84.18 fl ℥ (2,490 c. c.), on the third day, and 31.59 fl ℥ (937.5 c. c.), on the first day. The variations bore no definite relation to the meteorological record. There was no definite relation between the quantity of urine and the liquid ingesta. On the third day, with 84.18 fl ℥ of urine, the liquids taken amounted to 57.87 fl ℥;

and on the first day, with 31.59 fl ℥ of urine, the liquids taken amounted to 46.74 fl ℥. On the second day, the liquids taken amounted to 104.82 fl ℥, and the urine discharged, 46.14 fl ℥.

The average quantity of urine during these five days was 58.14 fl ℥ (1,720 c. c.). The average quantity of liquids taken was 69.22 fl ℥ (2,076.6 c. c.).

During the five days after the walk, for every 100 parts of liquid ingesta, the kidneys discharged 84 parts. During the five days before the walk, for every 100 parts of liquid ingesta, the kidneys discharged 58 parts. This is probably to be explained by the exercise of 8.2 miles daily for the five days before the walk, which would increase the action of the skin, while after the walk, the exercise was only 2.2 miles daily.

It will not be necessary to consider under a separate head the variations in the specific gravity of the urine, as this simply represents the solid constituents, which will be taken up separately.

Influence of Exercise upon the Elimination of Nitrogen, chiefly in the Urea, and the Relations between the Nitrogen discharged and the Nitrogen ingested.

As regards the elimination of nitrogen, the investigations were undertaken chiefly with reference to the influence of the great amount of muscular exertion during the five days of the walk. In order to ascertain exactly the amount of nitrogen excreted at this time, as compared with that discharged under ordinary conditions, the nitrogen of both the urea and fæces was taken. The proportion of nitrogen in the uric acid, cretine and creatinine of the urine is so insignificant, as compared with the total discharge, that it would hardly at all modify the results of the calculations. During the fifteen days, Mr. Weston took food according to his fancy. At certain times during the walk, he took immense quantities of tea and coffee; but the results of the calculations show that the modifications, if any, in the discharge of urea produced by those articles, must have been greatly overshadowed by those due to the muscular exertion. In the discussion of this, the most interesting and important of all the questions involved, the influence of food will be treated of from a secondary point of view. As re-

gards this point, there is no difference of opinion. Nitrogenized food always increases the elimination of urea; and so marked is this, that many physiologists hold the view that the urea is derived almost entirely from the food. This is one of the physiological questions definitively settled by these observations.

From the foregoing considerations, it is evident that the only rigidly accurate way to determine exactly the modifications in the elimination of nitrogen that are to be attributed to muscular exercise, is to calculate for each period, and for every day of each period, the proportion borne by the nitrogen in the urea and fæces to the nitrogen of the food. It is true that the influence of the food of one day may be prolonged for one or more days, and the same remark may possibly apply to the exercise; but the periods of five days each are sufficiently long to obviate any serious error from this cause. I have learned, however, from these calculations, that a period much shorter would not be entirely satisfactory.

The conclusions that I shall arrive at will all be drawn from Tables A.(1) B.(1) C.(1) for the first period, Tables A.(2) B.(2) C.(2) for the second period, and Tables A.(3) B.(3) C.(3) for the third period. Table D. gives the daily averages for the three periods.

First Period, Five Days before the Walk.—For the first day of this period, the total nitrogen of the urea and fæces amounted to 323.26 grains (20.945 grammes). The nitrogen of the food amounted to 361.22 grains (23.404 grammes). For every 100 parts of nitrogen of food, there were discharged in the urea and fæces, 89.49 parts. The exercise was fifteen miles. The nitrogen of the food was about 30 per cent. above the average for an ordinary man. The elimination of nitrogen per 100 parts of the nitrogen of food was considerably below the average.

On the second day, the total nitrogen of the urea and fæces was 301.18 grains (18.181 grammes). The nitrogen of the food amounted to 288.35 grains (18.682 grammes). For every 100 parts of nitrogen of food, there were discharged in the

urea and fæces, 104.45 parts. The exercise was five miles. The nitrogen of the food of this day was a little below the average.

On the third day, the total nitrogen of the urea and fæces was 330.36 grains (21.405 grammes). The nitrogen of the food amounted to 272.27 grains (17.641 grammes), much below the average for an ordinary man, which I put at 310 grains. For every 100 parts of nitrogen of food, there were discharged in the urea and fæces, 121.3 parts. The exercise was five miles.

On the fourth day, the total nitrogen of the urea and fæces was 300.57 grains (19.475 grammes). The nitrogen in the food amounted to 335.01 grains (21.706 grammes), a little above the average for an ordinary man. For every 100 parts of nitrogen of food, there were discharged in the urea and fæces, 89.75 parts. The exercise was fifteen miles.

On the fifth day, the total nitrogen of the urea and fæces was 320.06 grains (20.737 grammes). The nitrogen of the food amounted to 440.43 grains (28.536 grammes), very much above the average. For every 100 parts of nitrogen of food, there were excreted in the urea and fæces, 72.67 parts. The exercise was one mile, with ten hours' sleep.

Taking the averages for the five days, the nitrogen of the urea and fæces daily was 315.09 grains (20.149 grammes). The daily nitrogen of the food amounted to 339.46 grains (21.994 grammes). For every 100 parts of nitrogen of food, there were excreted in the urea and fæces, 95.53 parts, which may be taken as the normal average under ordinary conditions.

From these figures, the following important conclusions may be drawn:

1. Under ordinary conditions, about 95 per cent. of the nitrogen of food is represented in the urea and fæces, the remaining 5 per cent. may be put down to nitrogen discharged in other ways, and to an allowance for error in the estimates, particularly in the food.

2. In view of the extraordinary powers of endurance of Mr. Weston and his habit of walking long distances, I do not think that the variations in the amount of exercise during the five days are to be regarded as sufficient to influence, to any great extent, the elimination of nitrogen; and I consider that

these variations are chiefly due to the nitrogen of the ingesta. The influence of the food is undoubtedly manifested in a more marked manner one or two days after, than on the day on which the excess of nitrogen is taken. This fact has been recognized by physiologists, especially since the researches of Lehmann, to which reference has already been made.[1] On the first day, there was about 30 per cent. of excess of nitrogen in the food, and 89.49 parts of nitrogen discharged per 100 parts of nitrogen taken in. On the second and the third day, the nitrogen of the food was a little below the average. On these days, there was an average of 112.87 parts of nitrogen discharged per 100 parts of nitrogen taken in. On the fourth day, the nitrogen of the food was slightly in excess, with 89.75 parts per 100 discharged. On the fifth day, the nitrogen in the food was very largely in excess (42 per cent.), with 72.67 parts per 100 discharged. The absolute quantity of nitrogen discharged on the fifth day was large, but the proportion per 100 of the nitrogen of food was overbalanced by the immense quantity introduced.

What is the mechanism of the influence of nitrogenized food upon the discharge of nitrogen by the excretions? Does the excremental nitrogen come from a direct change of the nitrogenized constituents of the blood into urea in the blood itself, or is it derived from the nitrogenized food used, through the blood, in building up the nitrogenized semi-solids of the body, passing into the excretions through the processes of nutrition and disassimilation?

Although the answer to this question is, perhaps, beyond the limits of actual demonstration, the attainable facts point very strongly to the following solution:

The nitrogenized food occupies several hours in its digestion and appropriation by the blood, where it is changed into the nitrogenized nutritive principles of the circulating fluid. The process of its appropriation by the nitrogenized elements of the tissues, particularly the muscular system, is probably slower still. The chief product of disassimilation of the nitrogenized elements of the tissues is urea; and its separation is very slow and gradual, part of it being taken up from the tissues

[1] LEHMANN, *Physiological Chemistry*, Philadelphia, 1855, vol. i., p. 150.

directly by the blood, and part passing into the blood by the lymph. This fact is illustrated by the slow accumulation of urea in the blood after extirpation of the kidneys. If this be the mechanism of the production of urea, the increase in its quantity would be marked for a day or two after the introduction of an excess of nitrogenized food, which is a fact sufficiently well demonstrated by actual observation. If the excess of urea were directly formed in the blood from an excess of nitrogenized food, being discharged by the urine and leaving a stated and but slightly variable amount resulting from the actual disassimilation of the tissues, its increased discharge from an excess of nitrogenized food would be more rapidly developed.

Second Period, Five Days of the Walk.—On the first day of this period, Mr. Weston walked eighty miles, with one hour of sleep. The total nitrogen of the urea and fæces amounted to 357.10 grains (22.167 grammes). The nitrogen of the food was reduced more than 50 per cent. below the average, amounting to only 151.55 grains (9.820 grammes). For every 100 parts of nitrogen introduced, there were 235.63 parts of nitrogen discharged.

This enormous discharge of nitrogen, in proportion to the nitrogen of the food, may be in part explained by the large excess of nitrogen taken the day before ; but by far the greatest part can be attributed only to the extraordinary muscular exertion and the consequent waste of the muscular tissue. The loss of weight on the first day was 43.2 oz. (1,224.00 grammes.)

On the second day, Mr. Weston walked forty-eight miles, with 4 hours and 28 minutes of sleep. The total nitrogen of the urea and fæces amounted to 370.64 grains (24.015 grammes). The nitrogen of the food was largely increased, amounting to 265.92 grains (17.229 grammes). For every 100 parts of nitrogen introduced, there were discharged, 139.39 parts. On this day, there was still a large excess of nitrogen discharged ; but the proportion per 100 parts of the nitrogen introduced was reduced by the increase in the proportion in the food. The excessive discharge of nitrogen on this day is to be attributed almost exclusively to the muscular exertion of that, and, perhaps, of the previous day.

On the third day, Mr. Weston walked ninety-two miles, with 30 minutes' sleep. The entire quantity of nitrogen of the urea (no fæces were passed) was enormous, amounting to 397.58 grains (25.760 grammes, representing 851.95 grains (55.200 grammes) of urea, by far the largest amount discharged for any one of the five days. This corresponded to the greatest amount of muscular exertion, a fact which is very significant. The nitrogen of the food was slightly diminished, amounting to 228.61 grains (14.812 grammes). For every 100 parts of nitrogen introduced, there were discharged, 173.91 parts. This excessive discharge of nitrogen can only be attributed to the muscular exertion. On that day, Mr. Weston took six pints of strong coffee, which, if it had any effect, would have diminished the elimination of urea.

On the fourth day, Mr. Weston walked fifty-seven miles, with one hour of sleep. The nitrogen of the urea and fæces amounted to 348.53 grains (22.582 grammes). The nitrogen of the food was on this day diminished to the minimum, amounting to only 144.70 grains (9.376 grammes). For every 100 parts of nitrogen introduced, there were discharged, 240.86 parts, the largest excess observed during the five days.

At 10.30 P. M., on this day, Mr. Weston broke down completely. He could not see the track, and was taken staggering to his room, having reached, apparently, the limit of his endurance. His condition at that time, as shown by the records, was as follows: He had lost in weight 83.2 oz. (2,358.00 grammes), being reduced from 119.2 lbs. (54 k. 62 grammes) to 114 lbs. (51 k. 704 grammes). He had taken a daily average of 197.70 grains (12.809 grammes) of nitrogen in his food, while walking an average of sixty-nine and a quarter miles per diem, with an average of sleep in the twenty-four hours of 1 hour and 44 minutes, for four days. His daily average of nitrogen should have been 310 grains (about 20 grammes), not allowing for an increased quantity demanded to supply the waste engendered by his excessive muscular exertion. He had discharged for every 100 parts of nitrogen introduced, a daily average of 197.45 parts, nearly double, for four days. The calculations, as well as the general condition of the system,

show that the period had probably arrived when repair of the muscular substance had become absolutely necessary.

If these facts be accepted, and, leaving the widest margin for inaccuracy in the estimates, they cannot involve any considerable error, it is impossible to come to any other conclusion than that excessive and prolonged muscular exertion increases enormously the excretion of nitrogen, and that the excess of nitrogen discharged is due to an increased disassimilation of the muscular substance; and it is to be remembered that the experiments upon which this statement is based were made with a diet regulated solely by the taste of the individual under observation.

On the fifth day, after 9 hours and 26 minutes of sleep, the system reacted completely, and Mr. Weston walked forty and a half miles. The nitrogen of the urea and fæces was 332.77 grains (21.561 grammes). The nitrogen of the food was increased 165 per cent., amounting to 383.04 grains (24.818 grammes). For every 100 parts of nitrogen of food, there were discharged, 84.27 parts. The absolute quantity of nitrogen discharged was still very great, but the proportion to the nitrogen introduced was reduced by the great quantity in the food.

On this day, when there was apparent reaction after the complete prostration of the fourth day, the system seemed to appropriate nitrogen, as it were, with avidity, to repair the impoverished muscular tissue. The weight was increased on this day by 28 oz. (793 grammes).

A study of the averages for the five days of this period develops points of great interest and importance, some of which have already been considered in connection with the variations in weight:

First. The absolute discharge of nitrogen by the urea and fæces for each day, without considering the nitrogen of the food, is in a nearly uniform proportion to the number of miles walked. This proportion is but little disturbed, if it be assumed that the influence of the ingestion of nitrogen is prolonged for a period of from twenty-four to forty-eight hours.

Second. During the walk of 317½ miles in five consecutive days, for every 100 parts of nitrogen taken in with the food, there were discharged in the urea and fæces, 174.81

parts, against 95.53 parts per 100 for the five days before the walk, and 91.93 parts per 100 for the five days after the walk.

Third. The actual loss of weight during the five days of the walk, was 3.450 lbs. (1,565.00 grammes). The total quantity of nitrogen discharged in the urea and fæces during this period, in excess of the nitrogen taken in with the food, was 633.80 grains (40.030 grammes). Assuming that 3 parts of this nitrogen represents the waste of 100 parts of muscular tissue, the loss of muscular tissue calculated from the nitrogen excreted would amount to 3.018 lbs. (1,334.33 grammes), leaving only 0.43 of a pound (230.67 grammes) unaccounted for, which might be fat or water.[1]

Third Period, Five Days after the Walk.—The record of the fifth day of the second period shows that the system had already begun to recuperate after the depression of the fourth day, notwithstanding the walk of forty and a half miles. The explanation of this is to be found in the long sleep and the amount of nitrogenized food taken. During the third period, the exercise was practically nothing, being only 2.2 miles daily; the sleep averaged 8 hours and 29 minutes; and the nitrogen of the food averaged 440.93 grains (28.569 grammes). Mr. Weston did nothing but eat, sleep, and amuse himself, and this was a period of complete bodily and mental repose, admirably calculated for recuperation after the immense muscular exertion of the five days before. At the end of the five days, the weight had advanced to 120.75 lbs. (54 k. 765 grammes); 0.25 of a pound (110.00 grammes) over the weight at the beginning of the observations. Immediately after the walk, Mr. Weston felt perfectly well and continued well for the five days, with the exception of a slight headache on the afternoon and evening of the fifth day. He smoked from five to seven cigars daily, but took no alcoholic stimulants. His diet was normal in variety, but on some days the quantity of solid food was very large.

On the first day, the nitrogen of the food was 385.65 grains (24.987 grammes), about 64 per cent. above the average for

[1] See the section on variations in weight.

the five days of the walk. The nitrogen of the urea and fæces amounted to 295.70 grains (19.159 grammes), about 18 per cent. below the average for the five days of the walk. This reduction in the amount of nitrogen excreted is very significant. For every 100 parts of nitrogen of food, there were discharged in the urea and fæces, 76.68 parts.

On the second day, the nitrogen of the food was very much increased, amounting to 499.10 grains (32.338 grammes). The nitrogen of the urea and fæces was 358.81 grains (23.248 grammes). For every 100 parts of nitrogen of food, there were discharged, 71.81 parts.

On the third day, the nitrogen of the food was diminished, though it still largely exceeded the standard for an ordinary man. On this day it was 394.83 grains (25.582 grammes). The nitrogen of the urea and fæces was largely increased, amounting to 409.87 grains (26.556 grammes). For every 100 parts of nitrogen of food, there were discharged, 103.81 parts. This excess of nitrogen discharged is to be attributed to the immense quantity of nitrogen taken with the food on the day before.

On the fourth day, the nitrogen of the food was in enormous quantity, amounting to 641.71 grains (41.578 grammes), more than double the average for an ordinary man. The nitrogen discharged in the urea and fæces was 382.89 grains (24.808 grammes). For every 100 parts of nitrogen of food, there were discharged, 59.67 parts. This proportion was reduced by the very large quantity of nitrogen taken with the food.

On the fifth day, the nitrogen of the food was reduced to a little below the average for an ordinary man, amounting to 283.35 grains (18.359 grammes). The nitrogen of the urea and fæces was 418.49 grains (27.125 grammes), much more than the discharge on any day during the fifteen. For every 100 parts of nitrogen of food, there were discharged, 147.69 parts. This active discharge of nitrogen is explained by the immense amount taken in the food on the previous day. On this day, at midnight, the observations were terminated.

The daily observations during this period, taken in connection with those during the five days before the walk, have

established the following important fact with relation to the influence of nitrogenized food upon the excretion of nitrogen:

Every day that an excess of nitrogenized food was taken, it was followed, on the succeeding day, and, on one occasion, on the succeeding two days, by a largely increased discharge of nitrogen in the urea and fæces, the discharge on these days exceeding the amount taken in the food; but the general average for five days, during the period of five days before the walk, and the period of five days after the walk, was from 92 to 95 parts of nitrogen discharged, for every 100 parts of nitrogen introduced.

The average for the five days after the walk shows an introduction of 440.93 grains (28.569 grammes) of nitrogen daily, an excess of about 42 per cent. over the average for an ordinary man. For every 100 parts of nitrogen in the food, the average daily excretion, during this period, was 91.93 parts.

Influence of Exercise upon the Elimination of Uric Acid.

The results of the observations during the three periods, as regards the influence of the exercise during the five days of the walk, and the influence of food during the five days before and the five days after the walk, are unsatisfactory, and interesting chiefly in a negative point of view.

The quantities of uric acid for each day present very wide variations. For example, on the fourth day of the walk, the exercise being fifty-seven miles, the quantity was 9.21 grains (0.597 of a gramme), the greatest amount for any one day; and on the second day of the walk, the exercise being forty-eight miles, the uric acid was 0.14 of a grain (0.009 of a gramme); the smallest amount for any one day. On the second day of the first period, the quantity was 4.03 grains (0.261 of a gramme); and on the third day after the walk, the quantity was 0.31 of a grain (0.02 of a gramme). I have carefully compared the quantities for each day with the amount of exercise, and can find no definite relation between them. I have carefully compared the quantities for each day with the character and quantity of food, and with no more satisfactory result. Inasmuch as on certain days during the walk, Mr. Weston took immense quantities of coffee, it occurred to me that this might

influence the uric acid; but I did not find any confirmation of this idea in the tables. I calculated also for each day the proportion of uric acid per 100 parts of urea discharged, with the view of confirming or disproving the idea that uric acid is really urea in an imperfect condition of oxidation; but the results of these calculations were also unsatisfactory. Finally, I compared the sleep and the meteorological record with the uric acid, and could establish no relation between them. The variations were so irregular that it was impossible to trace any influence upon the uric acid due to food or exercise, even if it be assumed that the influence might be protracted for a period of one or more days.

As it is impossible to draw any positive conclusions from a comparison of the quantities of uric acid excreted day by day, I can only refer to the averages for the three periods of five days each.

The average daily excretion of uric acid for the five days before the walk was 2.26 grains (0.127 of a gramme). The proportion of uric acid per 100 parts of urea for this period was 0.362 of a part.

The average daily excretion for the five days, walking in all 317½ miles, was 3 grains (0.194 of a gramme). The proportion of uric acid per 100 parts of urea for this period was 0.409 of a part.

The average daily excretion for the five days after the walk was 1.42 grains (0.082 of a gramme). The proportion of uric acid per 100 parts of urea for this period was 0.187 of a part.

These results, in view of the inexplicable daily variations in the uric acid, are not sufficiently definite to lead to any positive conclusions. As far as they go, they show an increase in the uric acid of about 33 per cent. during the period of extraordinary muscular exertion. During the period of complete muscular inactivity, with an excess of food, the excretion was diminished about one-half.

The observations have developed, however, the following negative facts:

1. There is no apparent relation between the increase of urea and of uric acid, except that both are increased, with the other solid constituents of the urine. In other words, in increasing the

urea by exercise, there is no evidence that the uric acid is oxidized and converted into urea; for if that were the case, with the increase in the quantity of urea, there would be a diminution in the proportion of uric acid per 100 parts of urea; and this does not occur.

2. It is not shown that the quantity of nitrogenized food has any influence upon the elimination of uric acid; unless it be assumed that the diminution in the uric acid, during the period of inactivity and excess of nitrogenized food, be due to the food alone.

The important physiological results which I hoped to arrive at by studying the uric acid, with the inevitable applications of such results to pathological conditions, were not realized; and it must be admitted that our positive knowledge of the relations of uric acid to nutrition and disassimilation has not been advanced by these researches, though some important negative facts have been developed.

Influence of Exercise upon the Elimination of Inorganic Salts by the Kidneys.

In studying the variations in the proportions of the inorganic salts in the urine, it will be seen that the phosphoric and the sulphuric acid are generally in about the same ratio to each other, their excretion being apparently increased and diminished by the same causes. With the chloride of sodium, however, it is different. For example, on the third day of the walk, the amount of phosphoric acid is very large, while the chloride of sodium is in very small quantity, nearly at the minimum. As it is not improbable that different causes may influence, on the one hand, the phosphoric and the sulphuric acid, and on the other, the chloride of sodium, it will be proper to consider the chloride by itself.

Phosphoric and Sulphuric Acid.—It is undoubtedly true that the excretion of the phosphates and sulphates by the kidneys is largely influenced by the quantity of these principles in the food. They must, however, pass into the urine in one or both of two ways; either directly from the blood, as the salts are taken up by absorption, without becoming a part of

the tissues, or they may come from the tissues, by a process analogous to that of the production of urea. If these salts passed directly from the blood, their elimination would be almost entirely under the influence of the food, and this influence would be manifested soon after their introduction. If the phosphates and sulphates of the urine be derived from the tissues, in the process of disassimilation, when this process is increased in activity, as it was during the five days of the walk, the influence of the food would probably be overshadowed by the exaggerated activity of disassimilation, due to the extraordinary muscular effort. It is not possible to subject these questions to rigidly scientific inquiry without estimating exactly the phosphoric and the sulphuric acid in the food. This was impracticable; but the solid food was so little changed in its character during the different days of the three periods, that the variations in its quantity will be, to a certain extent, a measure of the introduction of the inorganic salts.

First Period, Five Days before the Walk.—During this period, the range of variation from day to day was from 43.01 to 67.00 for the phosphoric acid, and from 38.18 to 51.50 for the sulphuric acid. With one exception, these two acids varied from day to day in about the same ratio. On the first day, the phosphoric acid was in large quantity, with a small quantity of sulphuric acid. With the exception of the fifth day, both the phosphoric and the sulphuric acid were varied in a tolerably constant ratio to the variations in the nitrogenized food, being increased with the food, and *vice versa*. On the fifth day, when the quantity of nitrogenized food was the greatest, both the phosphoric and the sulphuric acid were below the average for the five days. On this day, the exercise was very slight, only one mile.

The most marked and constant variations during this period were with the exercise, especially in the phosphoric acid. On the first day, the exercise was fifteen miles; the phosphoric acid was 51.46 grains (3.334 grammes), the average for the five days being 50.14 grains (3.262 grammes), and the sulphuric acid was 38.37 grains (2.486 grammes), the average being 41.57 grains (2.693 grammes). On the fourth day, the exercise was fifteen miles; the phosphoric acid was 67 grains (4.341 grammes), and

the sulphuric acid, 51.50 grains (3.337 grammes). On this day, the loss of weight was 24 oz. (687 grammes), the greatest amount of loss for any one of the five days. On the second and the third day, both the phosphoric and the sulphuric acid were slightly below the average for the five days, with five miles of exercise during each day. On the fifth day, with ten hours of sleep and one mile of exercise, the phosphoric acid was 43.01 grains (2.787 grammes), and the sulphuric acid, 38.18 grains (2.474 grammes), the smallest quantities during the five days.

During this period, the increase in the phosphoric and the sulphuric acid with the exercise was constant.

Second Period, Five Days of the Walk.—During this period, the ratio of variations between the phosphoric and the sulphuric acid was constant, with the exception of the fifth day, when the quantity of sulphuric acid was a little greater than on the fourth day, while the phosphoric acid was less. During this period, there was no definite relation between the quantities of these two acids and the nitrogenized food; the influence of the food being apparently overshadowed by the exercise. The relations between the phosphoric acid and the exercise were nearly absolute. Taking the exercise from the highest to the lowest points, the relations were as follows:

Third day.	Exercise	92	miles.	PO_5	102.25	grains	(6.625	grammes).
First day.	"	80	"	"	84.95	"	(5.504	").
Fourth day.	"	57	"	"	66.90	"	(4.296	").
Second day.	"	48	"	"	72.14	"	(4.674	").
Fifth day.	"	40½	"	"	57.49	"	(3.725	").

The variations in the sulphuric acid were not so absolute:

Third day.	Exercise	92	miles.	SO_3	63.71	grains	(4.128	grammes).
First day.	"	80	"	"	73.39	"	(4.755	").
Fourth day.	"	57	"	"	32.66	"	(2.116	").
Second day.	"	48	"	"	56.90	"	(3.687	").
Fifth day.	"	40½	"	"	40.84	"	(2.646	").

These calculations show a decided and nearly absolute relation between the excretion of phosphoric acid and the amount of exercise. On the fourth day, with fifty-seven miles of exer-

cise, the nitrogen of the food was about forty-six per cent. less than on the second day, with forty-eight miles of exercise. This will, perhaps, account for the diminished excretion during the day of less exercise.

As regards the sulphuric acid, the conclusions are about the same as for the phosphoric acid. The diminished excretion on the second day is also accounted for by the small amount of nitrogenized food taken on that day.

Third Period, Five Days after the Walk.—During this period, the exercise was practically nothing; and this element does not, therefore, enter into the calculation of the variations of the inorganic constituents of the urine. Although the variations in the phosphoric and the sulphuric acid were considerable, as were the daily variations in the nitrogenized food, there seemed to be no definite relation between them. I shall, therefore, give for this period simply the extremes and the averages.

On the third day, the quantities both of phosphoric and of sulphuric acid were the greatest. The phosphoric acid was 105.68 grains (6.847 grammes). The sulphuric acid was 53.57 grains (3.471 grammes). On the first day, the phosphoric acid was least in quantity, being 29.06 grains (1.833 grammes), with 49.53 grains (3.209 grammes) of sulphuric acid. On the second day, the sulphuric acid was least in quantity, being 46.07 grains (2.985 grammes), with 46.93 grains (3.041 grammes) of phosphoric acid.

The averages for the five days of this period were as follows: Phosphoric acid, 56.89 grains (3.674 grammes); sulphuric acid, 49.02 grains (3.176 grammes).

Averages for the Three Periods.—The averages for the three periods of five days, each show very clearly the influence of exercise upon the elimination of phosphoric and sulphuric acid; and the averages for the period of five days before the walk, and the period of five days after the walk, show the influence of food, probably attributable to the phosphates and sulphates combined with the nitrogenized matters.

For the first period, five days before the walk, the average discharge of phosphoric acid was 50.14 grains (3.262 grammes),

and of sulphuric acid, 41.57 grains (2.693 grammes). The average quantity of nitrogen in the food was 339.46 grains (21.994 grammes).

For the second period, five days of the walk, the average discharge of phosphoric acid was 76.63 grains (4.965 grammes), and of sulphuric acid, 53.50 grains (3.666 grammes). The average quantity of nitrogen in the food was 234.76 grains (13.211 grammes).

For the third period, five days after the walk, the average discharge of phosphoric acid was 56.89 grains (3.674 grammes), and of sulphuric acid, 49.02 grains (3.176 grammes). The average quantity of nitrogen in the food was 440.93 grains (28.569 grammes).

These averages show that the walk of 317½ miles in five consecutive days increased the excretion of phosphoric acid more than 50 per cent. over the excretion under ordinary conditions, notwithstanding that the nitrogenized food was diminished 31 per cent. Under the same conditions, there was an increase of about 30 per cent. in the excretion of sulphuric acid. The influence of exercise upon the excretion of the phosphates and sulphates, irrespective of the composition of the food, cannot be doubted.

A comparison of the averages for the first period, five days before the walk, and the third period, five days after the walk, shows an increase in the excretion of phosphoric acid, for the third period, of 13.4 per cent., with an increase of 30 per cent. in the quantity of nitrogenized food. Under the same conditions, the excretion of sulphuric acid was increased 19.2 per cent.

Chloride of Sodium.—In the absence of exact estimates of the quantities of chloride of sodium contained in the food of each day, there is little to be learned from the variations in excretion of this salt by the kidneys. Such estimates were manifestly impracticable. The salt used as a condiment was averaged for the four days of the first period, and for the fifth day of this period with the five days of the walk. For the five days after the walk, the quantity of salt used was weighed each day. I can form no definite idea of the salt

used in cooking for the five days before the walk and the five days after the walk; but on some of the days of the walk, particularly the third and fourth, the diet consisted largely of beef-essence and oatmeal-gruel. No salt was added to the beef-essence, which was prepared under my own direction, and very little was used in the preparation of the oatmeal-gruel.

First Period, Five Days before the Walk.—The average quantity of salt used as a condiment during this period was 34.5 grains (2.235 grammes). During the five days, the proportion of nitrogenized food and the elimination of chloride of sodium presented no definite relation to each other. The variations in the chloride of sodium of the urine were not very considerable, and had no definite relation to the exercise. The greatest quantity was on the first day, amounting to 195.02 grains (12.636 grammes); and the smallest quantity was on the fourth day, when it was 106.68 grains (6.912 grammes). In the absence of any definite relation between the excretion of chloride of sodium and either the food or the exercise, I can only use the average for this period, which was 159.45 grains (10.331 grammes).

Second Period, Five Days of the Walk.—There are one or two interesting points in connection with the elimination of chloride of sodium during this period. The nitrogenized food, which would contain nearly all the chloride of sodium, was diminished 31 per cent., and the average quantity of salt used as a condiment was 35 grains (2.265 grammes). The average elimination of chloride of sodium by the kidneys was only 65.08 grains (4.217 grammes); but a large amount must have been eliminated by the skin, the average cutaneous and pulmonary exhalation daily being 138.41 oz. (3,875.18 grammes), against 61.63oz. (1,690.91 grammes), for the five days before the walk, and 62.82 oz. (1,706.78 grammes), for the five days after the walk.

On the third day, when the food contained, probably, the minimum proportion of salt, the salt of the urine was reduced to 44.45 grains (2.88 grammes), about 32 per cent. below the average for the five days. On the fourth day, it is probable that a little more salt was taken with the food. On this day,

the exercise was fifty-seven miles; but it was on this day that Mr. Weston broke down, and was forced to take a long rest. The chloride of sodium for this day was reduced to 28.78 grains (1.865 gramme), nearly 56 per cent. below the average. On the next day, when reaction took place, the salt returned to about the average. In view of the disappearance of the chloride of sodium of the urine in certain febrile conditions, this diminution in its quantity on the day of great constitutional depression is interesting, though its exact significance is not apparent.

Third Period, Five Days after the Walk.—The variations in the chloride of sodium of the urine during this period were enormous. The smallest quantity was on the first day, when it was 66.41 grains (4.303 grammes). The largest quantity was on the third day, when it was 622.58 grains (40.338 grammes). The quantity of urine on this day was 84.18 fl ℥. (2,490 c. c.). I could not connect these variations with the diet, or with the salt used as a condiment, which was weighed each day, and varied considerably. The only point connected with the daily variations during this period is the excessively small quantity on the day next after the walk, when it was only 66.41 grains (4.303 grammes), while the salt actually used as a condiment on that day was 65.62 grains (4.252 grammes).

The average daily quantity of chloride of sodium of the urine for this period was 312.40 grains (20.241 grammes). The nitrogenized food was increased 30 per cent. over the average for the five days before the walk. The average quantity of salt used as a condiment was 42 grains (2.721 grammes), an increase of nearly 22 per cent. over the average for the five days before the walk.

Averages for the Three Periods.—The averages for the three periods of five days each are as follows:

First period, five days before the walk, 159.45 grains (10.331 grammes).

Second period, five days of the walk, 65.08 grains (4.217 grammes).

Third period, five days after the walk, 312.40 grains (20.241 grammes).

These averages show a great diminution in the chloride of sodium of the urine during the walk, due in a great measure, undoubtedly, to a diminution in the quantity of salt ingested. In the absence of exact estimates of the quantity of salt introduced, it is impossible to state definitely the influence of exercise on its elimination by the kidneys. Probably it is diminished, a much larger amount than usual being eliminated by the skin. An argument in favor of this view is the small quantity in the urine the day next after the walk, when a large quantity was introduced with the food.

The only explanation I can offer of the great increase in the chloride of sodium during the five days after the walk is in the larger quantity taken with the food, and, possibly, the cessation of the influences which diminished it in the urine during the five days of the walk.

Abnormal Matters in the Urine.

There is very little to be said with regard to the abnormal matters discovered by microscopical examination of the urinary sediments. During the first period, five days before the walk, there was a constant deposit of octahedra of the oxalate of lime. During the second period, five days of the walk, the oxalate was found daily. On the fifth day of this period, in addition to the oxalate, there was a small quantity of the amorphous phosphates. The oxalate continued during the third period, five days after the walk, with the exception of the fourth day, when there were no abnormal matters. On the first day of this period, the sediment contained, in addition to the oxalate, amorphous urates in small quantity. On the second and the third day of this period, in addition to the oxalate, the sediment contained crystals of uric acid. On these days, the amount of uric acid in the urine, as determined by analysis, was very slight, and the crystals were probably due to increased acidity of the urine. I can offer no explanation of the presence of any of these crystals in the urine, nor can I connect them with any of the conditions observed.

On the second and the third day of the third period, five

days after the walk, the urine contained a trace of sugar. There was no increase in the amount of starchy and saccharine principles in the food on these days to account for the sugar, the presence of which cannot be readily explained.

In conclusion, it is evident, from the results of these investigations, that the great question of the influence of muscular exercise upon the elimination of nitrogen can be accurately studied only by comparing the nitrogen of the food with that of the excretions; and this should be done, if possible, upon a perfectly physiological diet. It is indispensable, also, to extend the experiments over periods of several days each; otherwise the results will necessarily be confused and unsatisfactory. The observations with regard to the weight and various other conditions were necessary to control the more important points to be considered. The great amount of material collected and its analysis and tabulation have involved considerable labor, which, however, has been rewarded by important conclusions of a definite and positive character.

At the risk of presenting to the reader an unattractive mass of statistics, I have felt it my duty to publish, not only the general facts and deductions, but the exact data collected, arranged in a form that may be useful to other investigators. I feel confident that I will not be reproached for tediousness of detail by those who are interested in the important physiological questions involved, particularly those who have carefully studied the literature of these questions for the past few years.

ART. II.—*On the Use of the Plaster-of-Paris Bandage in the Treatment of Fracture, especially Fracture of the Femur.* By HENRY B. SANDS, M. D., Professor of Anatomy in the College of Physicians and Surgeons, Surgeon to the Bellevue Hospital, etc.

THE treatment of fracture is a subject full of interest to the surgeon, on account of the responsibility which it involves, and the difficulty which is encountered, in many cases, of bringing about a satisfactory result. Excluding such instances

of failure as depend upon careless or unskilful management, it is a notorious fact that, even in the most practised hands, a perfect restoration of the injured parts to their normal state is an exception to the rule. The experienced and cautious surgeon will not guarantee to the patient the completeness of cure which he naturally and almost invariably expects, but states frankly, at the beginning, that more or less of deformity, and impairment of function, may be the final result.

This want of adaptation of the means to the end is, at first sight, somewhat surprising. To insure success, the indications themselves are few and simple. They are mainly twofold: first, to reduce the fragments; and, secondly, to maintain them in apposition until they are firmly united. Simple as these indications are, however, they are equally difficult to fulfil. As far as the bones are concerned, the problem is purely mechanical; and, if we had to deal with these alone, our task would be an easy one. In applying force, however, for the reduction and coaptation of fracture, we always act at a disadvantage, owing to the intervention of the more delicate soft parts that invest the bone. It is in consequence of the presence of these, to the influence which they exert in causing displacement, and to the injury to which they are liable, either at the time of fracture, or subsequently, from the pressure of the retentive apparatus, that the results of treatment are so often imperfect and unsatisfactory. By investing, more or less completely, the ends of the broken bone, they interfere, to a corresponding degree, with accuracy of diagnosis and nicety of adjustment. The muscles not only conceal the injured bone, but, by their spasmodic contraction, act powerfully in causing displacement of the fragments. The skin and subcutaneous connective tissue, moreover, not unfrequently suffer from the pressure or traction of the dressings; and the consequent supervention of pain, œdema, or excoriation, may compel the surgeon to remove them, thereby compromising the result, by leaving unopposed the forces which produce displacement.

These obstacles to success being appreciated and acknowledged, it becomes our duty to inquire how far they may be lessened, if not wholly removed; and whether, among the

different modes of treatment commonly pursued, any one of these can claim superiority. Such comparisons, however, are not easily made. They require the study of a large number of cases, which can be found only in the wards of a large hospital. Yet, even here, there is a tendency in favor of routine plans of treatment, sanctioned by long-established usage, and by increasing technical skill in the employment of a particular method. Thus, while in one hospital we find all fractures of the leg treated in the so-called fracture-box, in another we look in vain for such an apparatus. In one hospital, nearly every fractured leg or thigh is suspended, while in another this plan of treatment is, perhaps, unknown.

My object, in the present paper, is to embody the results of the treatment of fractures, on a somewhat extensive scale, by the plaster-of-Paris bandage, at the Bellevue Hospital, during the past eighteen months; and at the same time to discuss a few points relative to the general treatment of fractures, which are perhaps not yet definitely settled. My experience has led me to the conviction that the mode of treatment just referred to possesses advantages which are enjoyed by no other one in general use; and, although the method is not novel, it has not obtained, I think, from American surgeons, the careful and thorough trial which it deserves.

The remarks I am about to make relate to simple fractures, although the report includes, as will be seen, a few instances where the fracture was compound.

Supposing a fracture to come under the surgeon's care soon after it has occurred, the question arises, whether its reduction should be at once effected. At the present day, this question must be answered affirmatively. In former times it was maintained that, inasmuch as a week or ten days must elapse before the commencement of the reparative process, it would be useless to attempt immediate reduction, which, moreover, could then be accomplished only imperfectly, or with great difficulty, on account of the spasmodic contraction of the surrounding muscles. Another assumed reason for delay was founded upon the prevailing belief that a fracture was pretty sure to be followed by such an amount of inflammation and swelling of the injured parts, that, even if early

reduction were practicable, the apparatus necessary for preserving the fragments in coaptation could not be applied without annoyance, and even danger, to the patient.

Now, none of these arguments will be found valid, on careful examination. It is true that the formation of callus in fracture does not immediately follow the accident; but it begins at a much earlier period than was formerly supposed, and takes place most rapidly in young subjects, and when the smaller and more vascular bones are fractured. It has also been definitely ascertained that the production of callus from the *ends* of the fractured bone is both facilitated and accelerated by reduction at an early period. As long as the fractured surfaces are not in contact, they take little or no part in the work of repair.

In regard to the time when reduction can be most easily accomplished, I think a brief consideration of the causes of displacement will show that the earlier an attempt is made, the greater will be the chances of success. One among the more unusual causes of displacement is impaction of the fragments. Here there can be no doubt that, if reduction is to be effected at all, it can be performed as well immediately after the injury as at any subsequent period. It may be observed, however, that, in certain cases, it is impossible to disengage the fragments, without exposing them by dissection; and that, in other cases, reduction ought not to be attempted. Examples of the latter class are found in fracture of the spine, and in impacted fracture of the neck of the thigh-bone.

Serious difficulty in reduction sometimes arises from the interposition of a piece of muscle or fibrous tissue between the fragments, one of the latter having perforated the soft parts, but without injuring the skin. In a case of fractured clavicle, due to direct violence, I once saw the inner fragment driven through the trapezius muscle, where it was firmly retained until I released it by the knife. Similar causes sometimes prevent reduction in fracture of the lower end of the shaft of the femur, where the upper fragment perforates the rectus muscle, and in fracture through the surgical neck of the humerus; the tissues, in this case, being perforated by the lower fragment. In any of these instances, the constricting parts

may sometimes require to be divided, to render reduction practicable; and in all it is evident, that, whatever means be resorted to, should be used without delay, and before the occurrence of inflammation.

In certain cases, again, we are unable to control the fragments, on account of their situation. In fractures of the ribs, the sternum, the bones of the pelvis, and the neck of the femur within the capsular ligament, we can seldom employ with success the mechanical means which we find so useful elsewhere.

Leaving, now, these less frequent causes of displacement, and confining our attention mainly to fracture of the long bones, we find that the contraction of the voluntary muscles constitutes the chief obstacle to reduction. If any evidence is needful to prove the truth of this statement, we have only to examine a case of recent fracture of either the humerus or femur, near the middle of the shaft. Here we can both see and feel the rigid muscles contracting beneath the skin, thereby causing shortening and deformity of the injured limb. In many instances of fracture, the very kind of deformity may be predicted, by calculating the relative strength of the muscles situated on the different aspects of the broken bone. In fracture of the olecranon, or coronoid process of the ulna, and in fracture of the patella, no one will deny the agency of the muscles in causing displacement.

It is equally easy to prove that the deformity due to muscular contraction will be most likely to be corrected, if the extending force be applied immediately after the accident; whereas, if the attempt is not made until some days later, the shortening of the muscles will have become more or less permanent; and the infiltration of these and the neighboring soft parts with the products of inflammation will render the efforts at reduction more difficult, and not altogether free from risk.

In fractures, as in dislocations, our practice has undergone great changes since the introduction of anæsthetics, by the administration of which we are generally able to bring about a complete relaxation of the opposing muscles. As far as these are concerned, therefore, it may be taken for granted that their resistance can be neutralized, and that, consequently, a satis-

factory adjustment of the parts may be secured. In dislocation, the success thus obtained is not only immediate, but permanent. In fracture, on the contrary, the tendency to displacement recurs as soon as the patient has recovered from the effects of the anæsthetic; and it is requisite, not only to restore the fragments to their proper relations, but to maintain them in apposition until they are organically united. This is the vital point in the management of fracture. To reduce the fracture is usually practicable, and ofttimes easy; but is it possible to apply a dressing that shall maintain the coaptation of the fragments during the requisite period, and, at the same time, do no violence to the soft parts? That the fulfilment of this double indication is a difficult problem, is evident from the endless variety of apparatus recommended by surgical authorities for the treatment of fracture. It will be admitted, however, that the value of every such appliance must be measured, first, by its mechanical efficiency; and, secondly, by the comfort and safety with which it can be worn. Unless it meets both these requirements, it will not answer our wants. Now, it will be found, I think, on examination, that the plaster-of-Paris bandage fulfils these important indications more effectually than any other mode of dressing yet devised. In other and less essential particulars, also, it possesses advantages which should not be overlooked, while drawing a comparison between this and other plans of treatment.

In all the cases herewith reported, the plaster-of-Paris bandage was applied according to the method originally rec-I ommended by the Dutchs .urgeon, Mathijsen, in 1852. As consider this method greatly superior to that advocated by Pirogoff, which found favor at the New York Hospital some few years ago, I may be pardoned for describing it in detail.

The bandages are prepared in the following manner. A piece of soft, coarse, unbleached muslin is torn up into strips, about three yards in length, and varying in width from one to three inches, according to the thickness of the limb. Some freshly-prepared, dry plaster of Paris having been spread upon a table, it is then rubbed thoroughly into the meshes of the bandage on both its surfaces, sufficient plaster being applied to

conceal the texture of the muslin from view. The bandages are next loosely rolled up, and kept in a dry place until needed for use. Before applying them in cases of fracture, the following precautions are observed: The fracture having been reduced, the limb is covered by a layer of cotton or woollen batting; or, if these materials are not at hand, by a single thickness of old, soft blanket. Over this is applied a cotton, or what is still better, a flannel roller, care being taken to have the pressure gentle and uniform, and not to constrict the limb at any part. The plaster-of-Paris bandages, which have previously been immersed in water for about three minutes, are then put on, in sufficient number to secure the desired degree of firmness. About three layers of the bandage are usually adequate to the object in view. The bandage is to be laid on evenly and snugly, but uniformly, and without compressing the limb; and it is not necessary to avoid reversed turns, as has been stated by some authors. In a short time after the bandage has been applied, the plaster sets, and the dressing is then complete.

The plaster, when of good quality, hardens in about ten minutes; the maximum degree of firmness, however, is not reached until one or two hours later, when, the water having evaporated, the bandage dries and acquires an almost stony hardness. If, after the bandage has been applied, a mixture of plaster of Paris and water, of the consistence of cream, be evenly rubbed with the hand over the surface, the latter will become smooth, and elegantly polished; but, if an excess of plaster is applied in this manner, it will render the dressing exceedingly brittle, and liable to crack and crumble after it has been worn for a short time. When the proper proportions of plaster and muslin are hit upon, the bandage has a certain degree of elasticity, and the requisite firmness is obtained, without undue bulk or weight.

Experience has also shown that attention should be paid to the following points: the muslin selected for bandages should have the proper degree of thickness, and should be neither too fine nor too coarse. If too fine, its meshes will not receive the plaster, and, if too coarse, they will not retain it. The plaster should be very fine, such as is used by modellers, from whom it may conveniently be procured. The coarser varieties ought

to be rejected as unfit for surgical use. Great care must be taken to maintain accurate coaptation of the fragments, during the time the bandage is being applied, and subsequently, until it becomes firm.

When it is desired to remove the bandage, this may readily be done by cutting it through its entire length, with the point of a stout, sharp knife, directed somewhat obliquely. The bandage cannot be removed, however, without losing, to a certain degree, its firmness. In cases, therefore, where it becomes too loose, in consequence of the subsidence of swelling a few days after it has been applied, it is best to remove it altogether, and replace it by a new bandage.

In the cases presented, the extent to which the injured limb was enveloped by the bandage varied, although, in every instance, the flannel or muslin bandage, together with the padding next the skin, was employed from the hand or foot upward beyond the seat of fracture. In fracture of the forearm, the bandage was carried from the hand to the elbow; and in fracture of the olecranon, to the upper part of the humerus. In fracture of the humerus, the bandage extended from the hand to the shoulder, the latter joint being capped by a spica. Where the bones of the leg were broken, the bandage was made to surround the limb as high as the knee, this joint being generally left free. In fracture of the patella, in addition to the plaster-bandage, the approximation of the fragments was promoted by compresses of lint, placed above and below the broken bone. In private practice, I have, in this fracture, adopted a somewhat different method, and with excellent results. Previous to applying the plaster-bandage, I have drawn the fragments together by two broad strips of adhesive plaster, fastened upon the front of the leg and thigh, and buckled over the top of the injured bone. The plaster-bandage then being applied from the toes to the groin, a large fenestra was cut opposite the seat of fracture, in order to permit inspection of the fragments, and their further approximation, if necessary, by the bands of adhesive plaster.

The cases presented in this paper were all treated in the Bellevue and Centre Street Hospitals, within the past eighteen months, and care has been taken to collect all the cases found

in the hospital records. They occurred partly in my own wards, and partly in those of my colleagues, and the house-surgeons have shown a commendable zeal and diligence in perfecting the application of the bandage. I am indebted to Dr. Samuel St. John, one of the house-surgeons, for many of the details contained in the report.

The whole number of cases treated was ninety-three. Of these seven were fractures of the forearm, seven of the humerus, three of the patella, fifty-three of the bones of the leg, and twenty-three of the femur. Firm union was obtained in all cases except one, and in this, a case of fracture of the leg, the patient had well-marked constitutional syphilis. In many instances, the bandage was applied within a few hours after the injury; in others, not until after the lapse of from ten days to a fortnight. In a minority of cases, and whenever necessary, ether was administered to facilitate the coaptation of the fragments. In many of the cases, especially in the earlier ones treated for oblique fracture of the bones of the leg, the plaster-bandage was slit up on the third or fourth day, and reapplied, as is done with the starched bandage. This precaution was taken, in order to ascertain whether the displacement had recurred; but, in nearly every case, the fragments were found in good position, and of late such a precaution has not been deemed essential. In a few instances the bandage became loose from the subsidence of swelling; it was then removed, and replaced by a new one.

How soon after a fracture can the plaster-bandage be applied without risk? This point is one of great importance, and one concerning which much diversity of opinion prevails, although the majority of surgeons, I think, condemn the use of closely-fitting dressings before the subsidence of the inflammatory swelling which so often occurs a short time after the injury. It is obvious, however, that the early application of the bandage must be of great advantage, unless it can be shown that such a practice is dangerous. To investigate this point, I have selected for special study those cases in which the bandage was put on within the first seven days following the fracture; omitting, however, for the present, any reference to fractures of the femur, which I have reserved for separate consideration.

It may be proper to remark that the cases in the following table were not chosen for the early application of the plaster-bandage, because the injury was of slight degree. For some time, it was chiefly a matter of convenience whether the bandage should be applied at once, or the limb be permitted to remain for a longer or shorter time in a fracture-box, or some other temporary apparatus. For the past two months, however, not a single fracture-box has been employed in my hospital wards. (See table, p. 707.)

The facts above given are sufficient to show, that, in a great many cases, the plaster-bandage may be applied to a fractured limb, either immediately, or very soon after the accident, without the danger of injurious consequences. This practice, however, is deprecated by most surgical authorities, who assert that in no instance should tight dressings be resorted to until the inflammatory swelling has subsided; and cases in which gangrene of the limb has resulted from a neglect of this precaution are solemnly held up to us as a warning. Now, in this matter, as in many others, the truth lies between extremes. Having myself witnessed the occurrence of mortification from overtight bandaging, I am prepared to admit its disastrous consequences. But, a valuable method of treatment ought not to be condemned because the bungling employment of it is attended with risk. On the same principle we might denounce the pressure-treatment of aneurism, which, in skilful and cautious hands, has yielded such brilliant results. That the danger of gangrene has been greatly exaggerated, must be apparent from the fact that no such unpleasant consequence happened in any of the cases enumerated above. In truth, the timely application of moderate and uniform compression to the broken limb, so far from doing harm, is of the greatest service, by repressing the inflammatory swelling which, under the usual treatment, is so apt to occur. When a plaster-bandage is applied in a case of recent fracture, it further diminishes the chances of inflammation, by keeping the fragments in nearly exact coaptation; while, under the usual plan of treatment, displacement is tolerably sure to recur, giving rise to renewed irritation of the soft parts. Those who have treated, for example, an ordinary, simple fracture of the leg in a

Seat of Fracture.	Number of Cases treated.	Plaster-Bandage, when applied.	RESULT, ETC.
Shaft of Humerus.	3	2d day.	Firm union and good position. In one, the fracture was very oblique, and forcible extension was necessary while plaster hardened. Union occurred in 5 weeks, 4 weeks, and 5 weeks, respectively.
Radius & Ulna.	1	4th day.	Union in 24 days—no deformity nor stiffness.
Colles' Fracture of Radius.	4	1st day.	No. 1. Deformity marked on admission. Firm union in 4 weeks. Position perfect. No. 2. Deformity slight on admission—union in 5 weeks—good position. No. 3. Deformity great, and not entirely reducible—union in 5 weeks, with slight deformity. No. 4. Deformity marked, but reducible—union in 24 days—no deformity nor stiffness.
	1	3d day.	Great deformity, not wholly reducible—union in 6 weeks, with some deformity and considerable stiffness of fingers and wrist. Average period of union, 33 days.
Olecranon Process.	1	3d day.	Union in 4 weeks, by a ligament ⅛ inch in length.
Tibia and Fibula.	5	1st day.	Firm union, in good position.
	3	2d "	" " " "
	2	3d "	" " " " In one, deep extravasation, and circumference of injured limb, one-third greater than that of sound one. Plaster-bandage, 4 hours after accident. Patient on crutches next day. Union in 12 weeks.
	1	5th "	" " " "
	2	6th "	" " " " In one, fracture very oblique, the upper fragment projecting.
	3	7th "	" " " " Average—union in 6 weeks.
Tibia.	2	1st day.	Firm union, in good position.
	1	4th "	" " " "
	1	5th "	" " " "
	2	6th "	" " " "
	1	7th "	" " " " great swelling and ecchymosis. Average—union in 5 weeks.
Fibula.	1	1st day.	Firm union, in good position.
	2	2d "	" " " "
	1	3d "	" " " "
	1	7th "	" " " " Average—union in 5 weeks.
Pott's Fracture.	1	1st day.	Firm union, in good position.
	2	2d "	" " " " In one, much displacement and swelling.
	1	3d "	" " " "
	1	4th "	" " " "
	2	5th "	" " " "
	1	6th "	" " " " Average—union in 5 weeks.
Patella.	1	4th day.	Union by ligament ⅛ inch long. In fracture of the patella, the plaster-bandage can rarely be employed during the first week, as the effusion in the knee-joint is generally sufficient to prevent the close approximation of the fragments.

fracture-box, must acknowledge how much attention is daily required to preserve the fragments in place. However well the foot be fastened to the foot-piece, and however carefully the box be padded, a slight loosening of the dressings, or an incautious movement of the patient in bed, will often permit separation of the fragments, thus causing pain and irritation, and rendering necessary the further application of force to the already over-sensitive limb. These accidents are obviated by the plaster-bandage, which, when applied immediately after a fracture, surrounds the injured parts with an unyielding, accurately-fitting case, and efficiently secures the apposition of the fragments.

I maintain then, that, in almost every case of simple fracture, an immovable apparatus should be applied at the earliest practicable moment—if possible, immediately after the accident. Should inflammatory swelling or extravasation exist, the bandage may even then be used with advantage, care being taken to avoid undue pressure by placing an additional layer of cotton-wadding next the skin. The only cases in which I should consider its employment dangerous, are those in which gangrene seemed imminent, or in which erysipelatous or phlegmonous inflammation was in progress. Under such circumstances, the application of a tight dressing would obviously be inappropriate.

In fractures of the lower extremity, the treatment here advocated enables the patient to leave his bed, and to go about on crutches during the entire period of cure. The advantages he thereby enjoys, both in point of health and comfort, are too apparent to require further comment.

It has sometimes been stated that the early use of immovable dressings in fracture is objectionable, because the pressure interferes with the formation of callus, and in this manner increases the risk of a false joint. Billroth, who employs the plaster-of-Paris bandage, admits that union is often delayed, and endeavors to account for the delay by the fact that, where accurate coaptation is maintained from the beginning, the production of provisional callus is very limited. The permanent callus, it is true, forms in due time; but as its forma-

tion takes place naturally at a later period, the mobility of the fragments continues for a corresponding length of time.

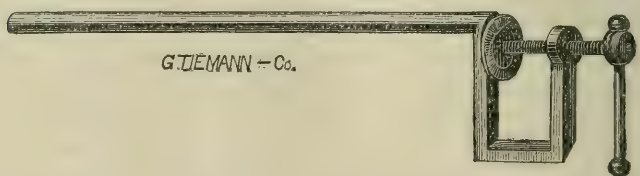
The figures given above render it doubtful, I think, whether any delay in consolidation is fairly chargeable on the method of treatment employed. In the cases tabulated, the average period of union will compare favorably with that usually observed; and, in the case where union was deferred to the twelfth week, the delay was probably due to a large, deep-seated extravasation.

Delayed union was also observed in two cases of fracture of the leg, not mentioned in the table. In one of these, the plaster-bandage was applied on the twelfth day, and in the other on the fourteenth day. In the first case, the patient left the hospital at the end of the eighth week, with the fracture only imperfectly united, although he was able to use the leg in walking. In the other case, firm union occurred after the lapse of six months. Both of these patients had constitutional syphilis.

Finally, I desire to speak briefly of the treatment of fracture of the thigh-bone; and, in so doing, I fear that I am treading on dangerous ground. The method advocated by Dr. Buck, consisting principally of the attachment of a weight to the foot, to overcome the contraction of the muscles, is so simple, and has borne such satisfactory results, as to leave little or nothing, perhaps, to be desired. Nor have I aught to say in disparagement of this plan of treatment. But I find the use of the plaster-bandage as efficient here as in other cases, and accompanied by the same advantage as in fracture of the leg; namely, that of allowing the patient to get out of bed, and to go about on crutches during the period of cure. I resorted to this method at first with some apprehensions as to the result, and I have been agreeably disappointed. Fracture of the femur is very justly regarded as the one in which shortening and deformity of the limb are most likely to occur from muscular contraction; for no other bone is surrounded by such thick and powerful muscles as this one. Indeed, the tendency to shortening in this fracture is so marked that, in adults, a restoration of the limb to its previous length is an exception to the rule. The cases here given, therefore, while they show the

applicability of the method of treatment described in this paper to fracture of the femur, may also be fairly adduced in evidence of its reliability as a means of retention in fractures generally. In other words, the plaster-of-Paris bandage finds its severest test in fracture of the thigh-bone.

The mode of applying the bandage in fracture of the femur is essentially the same as that followed in other cases. It is necessary, however, in some instances, to use considerable force in extending the limb to its normal length; and, if manual extension prove insufficient, the compound pulleys afford a safe and convenient means for accomplishing this object. They may be attached to the body by a piece of stout adhesive plaster, which, having been bandaged to the sides of the leg, projects beyond the sole of the foot in the form of a loop. An anæsthetic is not required in every case, but, in many, the assistance which it affords cannot be dispensed with. For the purpose of making counter-extension, I employ, in all cases, an iron bar, similar to the one recommended by Volkmann,



and for which an ordinary perineal band is a very indifferent substitute. This bar is so fastened as to rise vertically from the table on which the patient is placed during the adjustment of the bandage. Before being used, it should be covered with cotton, or any other soft material, to prevent injury to the perinæum. The patient having been placed astride of the bar, and ether administered, if necessary, sufficient extension must be made to bring the limb out to its proper length; the plaster-bandage should then be applied from the foot to the groin, and also around the pelvis in the form of a stout spica. It is while effecting this manœuvre that the use of the iron bar in the perinæum proves so serviceable. The patient can be lifted from the table by a couple of assistants, while the bandage is passed beneath the pelvis; counter-extension being, at the same time, effectually maintained.

During the application of the bandage, and until it has become firm, pains should be taken to preserve the proper length and position of the limb. In some of my own cases, extension was kept up for several hours after the bandage had been applied, by a weight of ten or fifteen pounds, suspended by a cord running over a pulley at the foot of the bed, the cord being attached to a loop of adhesive plaster in the usual manner. Especial care should be taken, also, to pad the perinæum evenly and thickly, either with cotton-wadding or with pieces of soft blanket, previous to applying the plaster-bandage. Unless this is done, the apparatus will not be worn with comfort, and the perinæum will be liable to excoriation. That part of the bandage which surrounds the hip and pelvis should be very strong; otherwise it is apt to give way at the flexure of the groin. Sometimes it is well to afford additional strength in this situation by a piece of felt, or sole-leather, of suitable size and shape, over which the turns of the spica may be carried.

If properly applied, the plaster-bandage is, in my judgment, better calculated to prevent motion between the fragments than any other dressing yet invented. The hip-joint is securely held, and displacement at the seat of fracture is almost impossible, as the entire lower extremity, including the corresponding side of the pelvis, must move together as a whole. Owing to the immobility of the hip-joint, the sitting posture is inadmissible; but the patient can recline upon a sofa, or easy-chair, and may be allowed to go around the room on crutches. He can also readily change his position in the bed, and raise the body to receive the bed-pan.

Applied in accordance with the foregoing rules, the plaster-bandage has been used in twenty-three cases of fracture of the femur, two of which were compound. The following abstract of the cases has been prepared from the hospital records:

Case I.—Bernard Reynolds, aged eighteen months. Fracture through middle of shaft, caused by the passage of a cart-wheel. Plaster-bandage on day following fracture. Bony union in five weeks. No shortening.

Case II.—Edward Murray, aged three years. Fracture through middle of shaft, from the kick of a horse. Shortening, on admission, one inch. Reduction without ether; plaster-bandage on fifth day. Splint removed in six weeks. Union firm; shortening, one-quarter of an inch.

Case III.—William Moss, aged four years. Fell twenty-five feet, fracturing right femur at middle. Shortening, on admission, an inch and a quarter. Plaster-bandage same day. During treatment, patient disobeyed orders, and walked about the hospital ward without crutches. Union in five weeks. Shortening, one-quarter of an inch.

Case IV.—James McNamara, aged seven. Fracture through shaft, at junction of middle and upper thirds. Considerable swelling of thigh, and effusion into knee-joint. Plaster-bandage second day. Removed in six weeks. Firm union; no shortening.

Case V.—William Suppron, aged nine. Fracture of shaft, caused by the wheel of an omnibus. Bandage applied on second day. Manual extension under ether. Union in five weeks. No shortening.

Case VI.—John Murphy, aged ten. Two hours before admission, his femur was broken near its middle, by the wheel of a cart. Plaster-bandage on seventh day. Union in six weeks. Shortening, three-eighths of an inch.

Case VII.—Edward Mills, aged fourteen. Fracture through middle of shaft. Shortening, one and a quarter inch. Plaster-bandage, under ether, on third day. Union in six weeks. Shortening, one quarter of an inch.

Case VIII.—Patrick Ford, aged twenty-eight. Fell from a horse and fractured right femur, at junction of middle and lower thirds. Shortening, three-quarters of an inch. Plaster-bandage on second day, with ether and manual extension. Union in six weeks. No shortening.

Case IX.—Peter Sloll, aged thirty-two. Fell twenty-three feet, fracturing shaft of left femur. Extension by weight and pulley for eleven days, when plaster-bandage was applied. The bandage caused excoriation of the perinæum, and was removed on the sixth day. Bony union occurred, but time not stated.

Case X.—Patrick Menel, aged thirty-three. Fracture at middle of shaft. Shortening, one and a quarter inch. Plaster-bandage on following day. Ether, and manual extension. Firm union in six weeks. No shortening.

Case XI.—Thomas Fitzgibbons, aged sixteen. Left femur at middle. Shortening, one inch. Put up in plaster-bandage on third day. Ether, and manual extension. Union in six weeks. Shortening, one-eighth of an inch.

Case XII.—Adam Beck, aged forty-three. Oblique fracture through middle of shaft. Shortening, one inch, and thigh greatly swollen. Plaster-bandage on third day. Ether, and compound pulleys. On seventeenth day, the bandage, having become loose from the subsidence of swelling, was removed as far down as the knee, and extension made by weight and pulley. On twenty-fourth day, bandage pieced out from knee upward. Union in six weeks. Shortening, one-eighth of an inch.

Case XIII.—Was a case of refracture. Samuel Loderer, aged eighteen, entered the hospital with fracture of femur near middle of shaft. Was treated by weight and pulley for four weeks, when there was some union, with one-quarter of an inch shortening. Patient got out of bed and refrac-

tured the bone. Plaster-bandage on third day. Union in five weeks. No shortening.

Case XIV.—Samuel Ranschenburg, aged sixty-three. Compound fracture at junction of middle and lower thirds—and fracture of bones of leg on same side, also an old irreducible luxation on dorsum ilii. Bandage on fourth day. Union in eight weeks. Slight anterior displacement of upper fragment. Owing to old dislocation, the length of limb could not be ascertained.

Case XV.—Patrick Donnelly, aged nineteen. Fracture of shaft at upper third. Shortening, one and a half inch. Extension by weight and pulley till eighth day, when plaster-bandage was applied. Ether, and manual extension. On eleventh day, abdominal part of bandage removed. Union in seven weeks. No shortening.

Case XVI.—F. Page, aged thirty-three. Fracture at junction of lower and middle thirds. Shortening one and three-fourths of an inch. Bandage on fifth day. Union in seven weeks. Shortening, one quarter of an inch.

Case XVII.—Patrick Rounds, aged thirty-two. Fracture through lower third. Shortening, one-half inch. Bandage applied under chloroform on third day. Union in seven weeks. No shortening.

Case XVIII.—Joseph Williams, aged thirty-three. Fracture just below lesser trochanter. Shortening, one and a quarter inch. Bandage on thirteenth day. Union in nine weeks. Shortening, one-quarter of an inch.

Case XIX.—Compound fracture. James Hamilton, aged forty-five, had his thigh caught between a coal-box and the end of a cart, two hours before admission. At lower part of Scarpa's space, and just external to femoral artery, was an opening an inch and a half in length, through which two fingers could be introduced, down to the ends of the broken bone. Fracture oblique, the upper fragment being strongly tilted forward. Plaster-bandage applied immediately, without ether. The leg and thigh were flexed, and bandage applied in that position. A fenestra was cut, to expose wound, which was dressed with oakum. Union in seven weeks. Shortening, three-quarters of an inch.

Case XX.—Christian Schneider, aged fifty-five. Fracture of cervix femoris, supposed to be extra capsula. Shortening, one and a half inch. Ether, pulleys, and plaster-bandage, on fourth day. Union in eight weeks. Shortening, three-eighths of an inch. Patient walks without assistance.

Case XXI.—Peter Oest, aged sixty. Fracture of right cervix femoris, extra capsula. Shortening, one and a quarter inch. Ether, pulleys, and plaster-bandage, on fifth day. Union in seven weeks. No shortening.

Case XXII.—David Dready, aged sixty-three. Cervix femoris. Shortening, one and a quarter inch. Plaster-bandage on fourth day, with ether and pulleys. Union in seven weeks. Shortening, three-quarters of an inch. Patient walks without assistance.

Case XXIII.—Thomas Callahan, aged forty-five. Fracture through great trochanter. Shortening, two inches. Ether, pulleys, and plaster-band-

age, on third day. Union in seven weeks. Shortening, one inch. Good motion at hip-joint.

An analysis of the cases above narrated affords the following results:

In eighteen out of twenty-three cases the bandage was applied within six days from the time of the injury. An anæsthetic was found necessary to permit reduction in eleven cases.

In one case, the bandage caused excoriation of the perinæum, and was removed. In no other instance was the bandage removed till bony union had taken place.

In one case (No. XIV.), although union was firm, the presence of an old dislocation prevented the length of the limb from being accurately measured.

The remaining cases, twenty-one in number, I have arranged in the following tables:

Result.

Under fifteen years of age, seven cases.	No	shortening in	2	cases.
	Maximum	"	$\frac{3}{8}$	inch.
	Average	"	$\frac{1}{6}$	"
	"	period of union,	$5\frac{1}{2}$	weeks.
Over fifteen years of age, fourteen cases.	No	shortening in	6	cases.
	Maximum	"	1	inch.
	Average	"	$\frac{1}{3}$	"
	"	period of union,	7	weeks.

These figures, I think, are conclusive respecting the efficiency of the plaster-bandage, as a means of treatment for fracture of the femur. They prove that our notions in regard to the necessity of applying some special kind of apparatus for extension and counter-extension are to a certain, degree, erroneous, and require modification. It is probable that, when a plaster-of-Paris bandage is applied in a case of fracture of the femur, the perinæum forms the chief seat of counter-extension. This view is supported by the fact that in one case (No. IX.) the perinæum became excoriated from the pressure of the bandage, and that in another (No. XV.), although all that part of the bandage situated above the groin was removed three days after it had been applied, yet recovery took place without any shortening of the limb. It is evident, however,

that the disposition to shortening is principally obviated by the nice adaptation of the bandage to the injured limb, around which it forms an exact mould, corresponding with all of its prominences and depressions, and thereby rendering displacement well-nigh impossible. It is in consequence, also, of the equal distribution of the pressure exerted by the plaster-bandage, that it rarely gives rise to those abrasions of the malleoli and other salient points, which so often attend the employment of wooden and metallic splints.

The prompt recovery of two adult patients, in whom the fracture of the femur was compound, is worthy of remark, as such a result is rare under any plan of treatment. In one of these cases, where the fracture was situated at the upper part of the shaft, and where the superior fragment was tilted strongly forward, satisfactory reduction was obtained by flexing the leg and thigh, the plaster-bandage being then applied to secure the limb in the flexed position. The precision with which it accomplished this object was equally striking and satisfactory.

In conclusion, the advantages of the plaster-of-Paris bandage in the treatment of fracture may be summed up in a few words. It affords a safe and reliable means for securing the fragments immediately after the accident, and in point of safety and efficiency it is far superior to the starched bandage, with which it is usually compared. It is safer, because it can be applied more evenly, and therefore with less risk of constricting the limb. Moreover, experiment has demonstrated that it undergoes no alteration in size or shape while drying; on the other hand, the materials entering into the composition of the starched bandage either shrink or expand during this process, thus causing corresponding changes in the bandage itself. As a means of coaptation, it is more certain, on account of the rapidity with which it hardens, whereas the starch bandage remains more or less soft and yielding for a period of twenty-four hours. This property of the plaster-bandage enables the surgeon to make powerful extension, if necessary, to maintain the fragments in apposition till the bandage has grown firm, after which the limb may be left to itself without the danger of further displacement.

The security which the bandage affords is especially marked in cases of fracture occurring in restless children, in the insane, and in persons suffering from delirium tremens. Another advantage in these cases is derived from the fact that the bandage is not readily soiled or loosened by contact with fecal or urinary discharges.

The objections which are usually made to the practice I have advocated, need not detain us. It has been pronounced inefficient; but this objection is fully answered by the marked success I have obtained in fracture of the femur, in which the causes of displacement are such as often to baffle our best exertions.

Again, it has been affirmed that the practice is hazardous, and that in inexperienced hands it will be followed by disastrous consequences. It would be impossible for me to prove the negative; yet I have no hesitation in saying that, by attention to the simple rules which have been given, any student acquainted with the rudiments of minor surgery will, after one or two trials, succeed in applying the bandage as well as the most skilful expert. Should the occurrence of pain, however, or of blueness and numbness of the fingers or toes, indicate any impediment to the circulation, the expedient of slitting up the bandage is an easy one, which ought not to be neglected.

But the mistake which the young or inexperienced surgeon is most likely to commit is undoubtedly that of imperfectly reducing the fragments during the application of the bandage. If these are placed in accurate coaptation, the bandage will prevent displacement; but, if the displacement have not been corrected before the dressing is applied, or if it be allowed to recur before the latter becomes firm, union with deformity will be the inevitable result. In case, therefore, a doubt on these points should arise in the mind of the surgeon, he ought to open the bandage, and inspect the parts, before it is too late to remedy any possible defect. In cases where the fracture is very oblique, or the tendency to deformity very marked, it might be proper always to examine the parts, before complete consolidation has taken place. There is a time, when the callus has acquired a considerable degree of firmness, al-

though it has not yet become hard and brittle, from ossification. If, during this période, any existing deformity be removed by suitable manipulation, very little external support is subsequently required, to obviate further displacement.

When I look back on the complicated and cumbersome mechanical contrivances which were recommended for the treatment of fracture when I was a student, and which many employ even at the present day, I cannot help thinking that the plaster-bandage is almost as great a boon to the surgeon as to the patient. By the aid of a few simple materials, such as it is always easy to procure, better results can be obtained than with the most expensive and complicated apparatus.

The plaster-bandage has also a wide and useful application in the treatment of compound fractures, club-foot, and diseases of the joints. These topics, however, are beyond the scope of the present communication. My main object is to urge the general adoption of the bandage in the management of simple fracture, as I feel convinced that its introduction constitutes one of the greatest advances in the practical surgery of modern times.

Art. III.—*The Causes and Treatment of Œdema of the Lungs.* By Thomas K. Cruse, M. D., House-Surgeon to Bellevue Hospital.

Being intercurrent with maladies of the most opposite nature, œdema of the lung has a decidedly varied etiology. From observation of the large number of cases of sunstroke brought to the hospital during the past summer, and from the labored respiration, the bloody froth at the mouth, the cyanosed appearance, and the finding, after death, intense hyperæmia and œdema of the lungs, I am convinced that this mechanical impediment to the aëration of the blood is responsible for a large proportion of the deaths from insolation. Again: the fact is well known, but its cause seldom appreciated, that, in the second stage of pneumonia, a patient, who has been doing well, suddenly may develop the most alarming dyspnœa, foam at the mouth, and may die from acute carbonic-acid poisoning.

As a part of the general dropsy of Bright's disease, sometimes œdema of the lungs occurs with such startling rapidity, that the patient is dead before treatment can be instituted. Of the same nature are those cases depending on a temporary hyperæmia of the kidney in the puerperal state. Compression of the lung, whether by tumors in the thorax, by a large pleuritic effusion, or by pneumo-hydrothorax, almost necessarily produces secondary œdema.

I had lately under observation a case of aneurism of the ascending aorta, as proved by the autopsy, in which the one constant physical sign was moist crepitation over both lungs, the patient being tormented with incessant cough, and raising an amazing quantity of serum mixed with bubbles of air. In debilitated persons, who have long lain on their backs, consequent intense hypostatic congestion is always accompanied by an amount of œdema which may be dangerous. Obstructions, in the course of the systemic circulation, will cause surcharge of the pulmonary capillaries with transudation of serum. To this class belong mitral stenosis and insufficiency, especially the former when complicated with pigment induration of the lungs. Aneurisms of the abdominal aorta, ovarian tumors, enlarged spleens, tumors of the liver, and those disorders of that organ which produce ascites, even intense tympanites, act in the same way. Regarding tympanites as a cause of œdema, during the past month I had in the surgical wards of Bellevue two patients with fracture of the spine in the upper dorsal region. These patients slowly developed a most intense gaseous distention of the intestines, and died a few days after their admission, greatly cyanosed, and with bloody froth at the mouth. At the autopsy, besides the disintegration of the cord at the seat of fracture, the diaphragm was found pressed high in the thorax by the distended intestines, the lungs being compressed, hyperæmic, and œdematous.

The slighter grades of œdema demand a treatment which is to be determined in each case by the etiology. Dyspnœa, from fluid accumulations in the abdomen, is relieved by tapping; tympanites, rebellious to the ordinary treatment, may be relieved by the recently-introduced method of puncture of the intestines; renal dropsy, seated in the lungs, frequently

yields to elaterium, or fluidounce doses of the infusion of digitalis. These drugs will be administered according to the convictions of different men, some believing in working a diseased kidney, and others not.

Although slight œdema may present no very grave symptoms, yet this circumstance should not favor inactivity, for a certain diminution of breathing-surface causes carbonic-acid accumulation in the blood, the nerve-centres are poisoned, the patient sinks into coma, and dies with general paralysis. Without doubt, pneumonia is the disease in which œdema of the lung most frequently arises—an œdema of the gravest nature. In cases of sudden death from pneumonia, how very constant is the appearance of the air-cells of almost the whole of one lung filled with inflammatory exudation, while from the cut surface of the other flows bloody serum! When the portion of lung designed for air is filled on one side by liquid, and on the other by a more consistent exudation, it is manifest that a patient will die from suffocation as surely as if a rope were tied around his neck. This state of extreme œdema, whether from pneumonia or not, is recognized when the respirations are greatly hurried, when the patient bubbles at the mouth, when the previously-fine râles rattle in the trachea, when the surface turns blue from overfilling of the veins, when large rhonchi are felt by laying the hand on the thorax, and when the sensibilities are clouded. For this condition—which demands action as prompt as the ligature of a bleeding arterial trunk—it has been the custom at Bellevue to cover the chest with dry cups, leaving them on until large serous blebs appeared. Lately, in a case of pneumonia affecting the whole right lung, with the exception of a small portion of the upper lobe, together with an œdema, such that, where there was no bronchial breathing, there was nothing but moist crepitation, I had the satisfaction of seeing imminent death averted by half an hour's persistent use of the cups, together with diaphoresis and an enema. Nevertheless, I have known the procedure to fail with other men, and lost a patient myself after its energetic trial, in whom, however, the pneumonia that caused the œdema was complicated by gastritis from a dose of Paris-green, taken for self-destruction.

The German practice of bloodletting for œdema of the lungs has, through timidity, never had a trial at Bellevue. The theory—that direct diminution of the volume of blood must relieve the pulmonary capillaries of undue pressure, and thereby prevent further transudation of serum—is perfectly logical. The one great objection to the measure is its debilitating influence in the after-progress of the case. To this its advocates respond, "that bleeding being the only remedy that will prove efficient in the extreme grades of œdema, and the condition being one of life or death, it becomes a duty to give the patient the only chance—to substitute a lesser evil for the greater one of death." This is legitimate reasoning.

During the month of January, a woman was admitted to the lying-in wards of Bellevue, who had a rapid and easy delivery, but during the night was attacked by convulsions, which persisted during the night and morning of the next day, in spite of chloroform and elaterium. At the latter time her condition was as follows: feet and legs, œdematous; coma, profound; urine, loaded with albumen, contains fatty and granular casts; respiration, forty per minute; moist crepitation at every point over both lungs; patient foams at the mouth; surface, blue. Dr. Barker then took from her forty ounces of black blood, which spurted from the vein as if under great pressure. In this blood I found one part urea to every nine hundred and sixty of the other constituents of the serum. The patient had no more convulsions after the venesection, and, in addition, the surface assumed its normal appearance, respiration fell to twenty-six per minute, in five minutes the normal vesicular murmur was heard over the whole chest, and in half an hour consciousness returned.

ART. IV.—*A Plea for Bloodletting.* By D. S. H. SMITH, M. D., L. R. C. S. Edin., New York City.

ON a cold, windy October morning in 1868, I was hastily summoned to see a farm-laborer, who had become ill very suddenly. I drove over to his house immediately, and there I found a young man, about twenty-eight years of age, reclining in a semi-dorsal position upon a sofa. He complained of frequent, agonizing, stabbing pain in his right side. His face

was flushed, and anxious in expression, his breathing shallow and quickened, his pulse rapid and hard. The affected side toward which he lay was almost motionless and rigid. A stethoscopic examination gave no satisfactory information. He had gone out to milk his cows about an hour before he sent for me, apparently in his usual excellent health. He soon felt a pain in his side, and started for his house. He had not gone half the distance (about an eighth of a mile), when the pain became so intense that he was obliged to drop his pail, and to use both hands to support his side. This man I bled—not *pleno rivo*—for, being unaccustomed to the operation, I could get only a dribbling rivulet as compared with the rushing stream of the books. Nor was my patient in the sitting posture, for he refused to move, fearing a sudden increase of pain, the severity of which he declared to be almost great enough to take away his life. The blood had flowed a very short time when he drew a slightly longer breath. When about a pint had been taken away, he was able to take almost a full inspiration. The arm was then bound up, the patient put to bed, and four grains of Dover's powder, every four hours, prescribed for him. On the next day but one he returned to his usual work. His side never afterward gave him any annoyance, nor did he feel the slightest ill-effects from the loss of so much blood.

On May 25, 1868, I returned home after an absence of two days, and found there an anxious messenger, who desired me to go at once to see one of his friends. The patient had acute inflammation of all the structures of the right eyeball, from the conjunctiva to the retina. His cheek, his temple, and his forehead, were raw from the use of mustard and other counter-irritants. From these applications he had experienced no mitigation of pain, nor any improvement in vision. On the contrary, the disease had progressively increased in severity during the preceding three days. I washed the blistered surfaces, removed every trace of uncleanliness from the sound skin that remained, and then applied six hungry leeches around the edge of the orbit. Long before they ceased sucking, he expressed himself relieved. When they had fallen off, and the bleeding from their bites had ceased, he was comparatively comfortable. Six grains of Dover's powder every four hours were prescribed. That night he had some refreshing sleep. The next day he complained of some slight increase of pain, when four other leeches were applied. The Dover's powder was kept up during the succeeding four days. No other treatment was used, yet the conjunctival and sclerotic vascularity rapidly diminished, the cloudiness of the cornea cleared off, the flashes of light ceased. In a week, he was for all practical purposes a well man.

Cases are frequently recorded in the medical journals in which bloodletting gives as prompt, as effective, and as abiding relief to urgent symptoms, as in the two cases narrated above. The annals of medicine, even in the last twenty years of skepticism, abound in similar histories. Yet this most efficacious,

and, in appropriate cases, most satisfactory remedial agent, has fallen into disrepute, because unwise men have failed in their efforts to make it a universal panacea. Men who ought to know better and who do know better, who have used bloodletting with the most brilliant success in more cases than they are perhaps willing to confess to, display their ingratitude by the gravest warnings to all who may be tempted to follow in their path. "The abuse of a thing is no argument against its use," has almost passed into an aphorism. That bloodletting has been shamefully abused, no one will pretend to deny, but so has every article in the materia medica. If, then, a physician were to refuse to use all those drugs which had been given unwisely, either in doses too large or in inappropriate cases, he would allow his patients to suffer without any attempt to relieve them.

In the complex series of changes which takes place in the inflammatory process, we are yet ignorant of the precise part taken by the nutrient nerves. We have reason to believe that in many cases it is a part of great importance. We do know the mechanical changes in the minutest blood-vessels, and in the current of blood. There is in the first place a contraction of the blood-vessels, and at the same time an increased motion in the streamlets of blood flowing through them, at the part said to be the seat of inflammation. In the next stage, the arterioles, capillaries, and venules, have yielded to the pressure of the increased supply of blood thrown upon them, and have become tortuous and dilated. They have lost their natural tonicity, their inherent power (the arterioles more specially), of regulating the supply of blood to a part, and have now become mere mechanical channels through which the blood flows. Coincident with this paralyzed condition, or immediately subsequent to it, the stream of blood flows more slowly, and the white corpuscles begin to collect along the sides of the vessels. This is the stage of engorgement. If, at this point, we can relieve the over-distended blood-vessels by abstracting a portion of their contents, and giving them time to regain their tonicity, can secure them against further over-distention, we remove every thing which interferes with the healthy performance of the function of circulation at the

seat of trouble. If not, then begins in the next stage the essential feature of the inflammatory process, the effusion of plastic material through the walls of the blood-vessels into the surrounding tissue. Yet, early in this last stage, it is possible to prevent further organic change by relieving over-distention as in the stage of engorgement.

It is necessary that one should represent clearly to his mind the abnormal condition which he proposes to relieve by bloodletting, and the *modus operandi* of his remedy. Take, for instance, puerperal convulsions in their epileptic form: The enlarged uterus so presses upon the renal veins as practically to obliterate them for the time being. The renal arteries go on pumping blood into the kidney, until the engorged gland can contain no more. Its essential function, the filtration of urea from the blood, is seriously interfered with. Urea and uric acid collect in the circulating fluid, and the unfortunate woman is poisoned by her own tissue-waste. The contact of these materials with the delicate elements of the nervous centres is the immediate and final cause of convulsions attended with albuminuria. In a pint or more of blood, a quantity of the offending material is removed, and time is given the physician to hasten labor or to extract the fœtus, and restore as soon as possible the renal circulation, by removing the mechanical pressure upon it.

In the Dublin *Journal of Medical Science*, for November, 1842, is an interesting and instructive article by Dr. James O'Beirne, on "The Nature and Treatment of Dropsy." It is impossible to give a satisfactory synopsis of it here, but it will serve our purpose to refer to the very beneficial effects of bleeding in the second of the six cases related by the writer. In this patient, undoubtedly the fountain-head of all his troubles lay in tubal nephritis consequent upon scarlet fever. The patient had begun to convalesce from scarlet fever, and, when the doctor saw him, he was suffering as follows:

> He was sitting up in bed, doubled forward, that being the only position in which, as he said, he could breathe, or which he had been able to assume during the preceding two days. His face, neck, trunk, lower extremities, and hands, were greatly swollen and œdematous. His lips were of a dark-purple color, and the wings of his nose were in rapid motion. His pulse was full,

soft, compressible and intermitting, and the action of his heart tumultuous and irregular. His breathing could scarcely be more difficult, and, on succussion, the sound of a large quantity of fluid was distinctly audible to those standing around the bed. The abdomen was much distended, and evidently contained a large quantity of fluid. On inquiry (and here is the key which unlocks the pathology of the case), I found that he had passed no urine that day, and not more than two ounces, of a high color, during the two previous days; in fact, there was total suppression of urine.

The patient's youth, his previous strength, and the fact that bleeding had not been employed, induced me to entertain some hope of success. I therefore proceeded to take blood from his arm, and, finding that he did not become weak, allowed it to flow until ten ounces had been taken. When about half this quantity had been drawn, the patient exclaimed, "Doctor, you have saved my life," and, when his arm was bound up, he was able to lie down with comparatively great ease.

He was now (11 o'clock in the forenoon) ordered fifteen grains of compound jalap-powder every four hours, until his bowels moved. When the doctor saw him again, at 8 P. M., he found that his bowels had been moved, and (most important of all) that he had passed *more than a pint of highly-colored lateritious urine.* That night the patient was again bled to six ounces, and the next day to six ounces. There was an abundant and rapid increase in the quantity of urine, which soon lost its high color. All other urgent and threatening symptoms speedily disappeared, and in ten days the patient was in perfect health.

Now, unless we suppose Dr. O'Beirne to have been guilty of a wilful and malignant perversion of facts, certainly no remedy at our command nor any combination of the substitutes for bleeding could have given such speedy, decided, and permanent relief to a man who was literally dying.

A great deal of unfair invective has been spoken and written upon the "spoliative" effects of bloodletting. There are very few men who cannot bear the loss of twelve or fourteen ounces of blood without any after ill-effects. If the withdrawal of this amount does not make a decided impression upon an acute inflammatory disease, it is not probable that further bleeding will be beneficial. The constitution of the individual and the nature of his malady must in each case be taken into consideration. To take blood from the arm of a patient until his rosy complexion changes to a waxen hue is an unpardonable wrong. Many months and even years will elapse before he recovers from such shameful malpractice. Important functions are sometimes very profoundly modified

by great loss of blood, as in a case of *post-partum* hæmorrhage which came under my observation in October, 1870. The patient had always enjoyed typical health up to the time of her labor. Flooding came on about six hours after the birth of the child, and before it was brought under complete subjection she had lost an enormous quantity of blood. Her convalescence was very prolonged, and she *never secreted a drop of milk.* In spite of stimulating tonic treatment and the most nutritious diet, she continues very pale, and her nervous and muscular strength remain very much impaired. Here is a case in which the individual will never, in all probability, recover her former state of rude typical health. The most ardent advocates of bleeding will not for a moment deny that the physician who imitates closely this unfortunate accident is deserving of the highest censure.

Nor in actual disease alone do we find very beneficial results from this remedial agent. Occasionally we meet with a man (more frequently in the country than in the town) in whom the manufacture of blood goes on rapidly and in excess. His complexion is florid, his body well nourished. The least exertion will bring on headache or giddiness, with a sensation of throbbing fulness throughout the whole arterial system. Sometimes, when he is perfectly quiescent, this universal throbbing is extremely annoying. If this man have an atheromatous artery, there is great danger of the weakened vessel giving way at the seat of degeneration. Death would be the certain and immediate result, for the blood would pour through a rent in a resistless stream. There are many such men, who know by practical experience the beneficial effects of bleeding, and who resort to it at regular intervals. It is useless to argue with them, and, if their ordinary medical attendant refuses to relieve them, they will put themselves into the hands of the first one who will. Plethoric women at the menopause frequently suffer from a group of symptoms similar to the symptoms of which this class of men complain, and depending upon the same condition, excess of blood, and too great arterial tension. In them, too, bleeding gives the most satisfactory results.

There are certain non-inflammatory conditions in non-pleth-

oric patients, which are speedily and effectually relieved by bloodletting. In the spring of 1868 a man who was suffering from periodical hemicrania consulted me. At eleven o'clock every forenoon he became sensible of an unpleasant formication in one eyebrow. In an hour and a half this had increased to an unbearable agony. The pain then began to mitigate, and by two or half-past two had entirely disappeared. The patient was thin, and incapable of much prolonged muscular exertion—by no means a typical subject for bleeding. Yet, he insisted upon my taking blood from his arm. It was in vain that I depicted the evil results of such a procedure in a man of his bodily habit. I rang all the changes upon "spoliation of the vital fluid," but to no purpose. All he knew was that he had suffered from the same trouble every spring for a number of years, that bleeding had always given him immediate relief, and that he had never experienced any ill effects from the treatment. The patient went elsewhere, was bled, and was relieved. A year after he again applied to me, when I induced him to try quinine in large doses. The pain reappeared daily, with diminished intensity for a week, when it disappeared. It reappeared in the spring of 1870, but, as he did not apply to me, I presume that he sought relief as of old in bloodletting.

Since the year 1867 I have had under observation a lady, who suffers occasionally from bronchial hæmorrhage. Shortly before any bloody expectoration, she complains of great thoracic oppression and fulness. There is increased action of her heart, which has become greatly dilated and hypertrophied. These symptoms immediately precede catamenial periods when the uterus is quiescent. The case, in short, is one of vicarious menstruation. As soon as the uterus is made to take upon itself the performance of its functions, the unpleasant thoracic symptoms at once disappear, and, if there has been any bloody expectoration, it immediately ceases. Six ounces of blood from this lady's arm would at any time relieve her thoracic oppression. But, were her physician to suggest it, a suspicion of his sanity would at once be roused in the minds of her friends. According to the education which they have received, they would be right, for she is tall, frail, thin, delicate, and very sluggish in all her bodily functions.

To describe the various forms of disease in which the abstraction of blood is attended by beneficial results, would fill a volume of considerable size. The end in view is ever the same—the relief of the capillary system of blood-vessels from over-distention, whether that be due to mechanical pressure at some important point, or to vital activity of the circulation at the seat of disease. No treatment can begin to supplant it in appropriate cases. For many years it has been under a cloud, but the mists are now clearing away, and physicians are beginning to show a scientific appreciation of it. In conclusion, I cannot do better than to quote Dr. Richardson's views as epitomized at the close of his address before the Medical Society of London in 1868: "I would recall," said he, "that bloodletting, as a point of scientific practice, is still open to us in some stages of typhus fever; in cases where there is a sudden tension of blood, of which sunstroke is an example; in cases of chronic congestion of brain; in cases of acute pain from serous membrane; in some classes of spasmodic pain; in cases of sudden arrest of circulation from concussion; in cases of congestion of the right heart; and, it may be, in external cases of hæmorrhage. Above all, I claim for it a first place in treatment of simple uræmic coma."

Clinical Records from Private and Hospital Practice.

I.—*Bloodletting in Puerperal Eclampsia.* By Walter Lambert, M. D., Amherstburg, Canada.

Madame B. A., French Canadienne, was confined March 6th, by "une sage-femme," with her sixth child. Every thing, I was informed, passed off naturally, as had also been the case in the previous labors. On the afternoon of the 9th she had a convulsion, followed by four more during the night and the next day, in the evening of which I was summoned to see her. I arrived at her bedside about 6 P. M. Found her comatose, in which state she had been some two or or three hours. Body flaccid, and perfectly quiescent, with the exception of the movements caused by the respiration, which was excessively oppressed, with a great collection of mucus in the trachea and bronchi, causing that peculiar sound vulgarly termed the "death-rattles." Pulse rapid and full. Pupils insensible to light. In fact, every symptom indicated impending dissolution. However, I plunged a lancet (which I always carry, but rarely use) into the median basilic vein, and bled her *pleno rivo*, to the full extent of about fifty ounces, not

in a graduated basin, as the late lamented Prof. Elliot recommends in his posthumous article, but in a tin milk-pan, which was the most convenient thing that I could command. The only immediate effect of the bleeding was to relieve the difficulty of the respiration, and tranquillize the pulse; but it did not restore consciousness. I left her in that state between 7 and 8 P. M., Friday night, supposing she would succumb before I reached home, which, by-the-bye, is six miles distant. Early the next morning I was informed that she began to rally soon after I left, and that she could then speak and take nourishment; but that she had no recollection of what had transpired the day before. I saw her at 9 A. M. of the 11th, and of course found her weak and pale, but conscious; respiration easy, and pulse tranquil. Ordered ℞. pot. bromidi, ʒ ss., syr. simp. aquæ āā ℥ ij. ft. sol. Dessertspoonful every three or four hours. To be supported with animal broths. And if the eclampsia showed any signs of reappearing, she was to have fifteen grains of the chloral hydrate, every one, two, or three hours, according to the symptoms. Fortunately, she did not require it, and is now quite convalescent.

I am convinced nothing could have saved this woman but bloodletting, and hold the same opinion in the case of another that I attended in January of 1862. In the latter, the eclampsia came on before the labor. I bled freely, and had just left the house when I was called back to the patient, she being then in another fit. I took off the bandage, and let the blood flow again. I do not remember how much blood was abstracted; but this I do remember, she had no more convulsions.

II.—*Two Cases of Puerperal Convulsions.* Reported by BENJAMIN H. BISHOP, M. D., Hoosick Falls, N. Y.

I VENTURE to put upon record the two following cases, which have occurred in my practice within the past year, hoping they may contribute something to a solution of the vexed question of the use of bloodletting in purperal eclampsia:

CASE I.—Mrs. Russel, multipara, aged twenty-four, always "healthy," was attacked with convulsions at the approach of labor. I was summoned; found her sitting up in bed; manner very excited. She had had four convulsions previous to my arrival. I attempted to perform venesection, but she offered such resistance, that I relinquished the operation. I called an assistant, put her under the influence of chloroform, and proceeded to deliver with the forceps, there being sufficient dilatation of the os, and a complete "inertia" of the womb. Delivery was not accomplished until the expiration of about two hours, when a living, healthy girl, weighing eight pounds and a quarter, was born. The patient had several convulsions

during the operation. After delivery I gave two drops of croton oil, which operated freely; and applied a blister between the scapulæ. She continued to have convulsions until eleven o'clock, when she died apoplectic, six hours after delivery, and about thirteen hours after the first convulsion.

Case II.—Mrs. P. Henley, primipara, aged twenty-six, healthy, was taken with convulsions on the evening of November 1st. A physician was called, but considered it nothing but a "fainting-fit," and prescribed accordingly. One hour after, I was summoned, and arrived in time to see her have a most terrible convulsion. In about fifteen minutes she had another, this making the third. I tied her arm, and took about thirty ounces of blood, after which she rested comparatively easy, until about four o'clock the next morning, being four hours after the last convulsion. Labor not having commenced, I left her during this time. At four o'clock was called again, she being again in convulsions; she continued to have them until ten o'clock, when I called an assistant and put her under the influence of chloroform. Dilatation having taken place, I proceeded to deliver her, which I succeeded in doing (with forceps), after the expiration of about four hours, she having a convulsion every half-hour during the operation. I gave croton oil, and applied a blister to the back between the scapulæ. She had another slight convulsion about two hours after delivery, this being the last. She made a perfect recovery in about two weeks.

III.—*Case of a Costo-Scapular Joint.* Reported by Richard Hesse, M. D., Brooklyn, N. Y.

An Irish mechanic, aged twenty-three, came into the Dispensary, under treatment of Dr. Giberson, complaining of a peculiar grating sensation in moving his left arm. He observed it first four or five years ago; had at that time some pain in the region of the articulation of the second or third rib with the sternum; there was no loss of strength or motion, no history of injury, and there had been no medical attendance.

The five surgeons present could, on examination, detect nothing but a distinct noisy crepitation on moving the left arm of the patient, and some pain on pressure over the articulation of the third rib with the sternum. Crepitation was found to be most marked below the shoulder-blade, near the fourth rib. After elevating the lower angle of the shoulder-blade, crepitation was found less distinct than before. All the surgeons agreed that the crepitation was not in the shoulder-joint, but between the shoulder-blade and ribs.

The interpretation of this remarkable case, I believe, is to

be found in the existence of a costo-scapular joint, discovered by Luschka.

In the *Prager Vierteljahrschrift*, cvii., 1870, Luschka describes a case of a costo-scapular joint on the left side found on dissection of a man about forty years old. In the case reported by Luschka the articulation between the scapula and third or fourth rib was very loose and lax; the serratus posticus muscle, which lies between the scapula and ribs, showed a loss of substance corresponding to the site of the joint.

As Luschka had previously shown, the surface of the bone in this place is frequently covered with a thin layer of cartilage, which, according to Wenzel Gruber, sometimes forms a round eminence of one to one and a half line in height.

Probably there is some relation between a joint on this place and the bursa mucosa intraserrata, which is found in the same situation frequently. In one-fifth of the cases reported by Wenzel Gruber the above-described cartilaginous eminence communicated with the cavity of that bursa mucosa.

IV.—*Two Cases of Facial Neuralgia. Treated by Extirpation of Nerve.* Service of Prof. James R. Wood, M. D. Reported by Charles W. Badeau, M. D., late House Physician Bellevue Hospital.

Case I.—Mrs. Emma G., aged fifty-two, married thirty-six years, and the mother of ten children.

Eight years ago she began to suffer from neuralgic pain in the left side of the face and jaw. Since then she has been under the care of several physicians, and at four different times has had subcutaneous operations performed on her face, none of which afforded her any permanent relief.

In September, 1869, she called on Dr. James R. Wood. When seen by him she was suffering from intense, sharp, shooting pains in the left side of the jaw and face. There was dimness of vision of the left eye. Dr. Wood recommended extirpation of the superior maxillary nerve behind the spheno-palatine ganglion. The patient consenting, the operation was performed on Thursday, September 28th. Ether being administered, a semilunar incision was made in the left cheek, commencing at the inner, and terminating external to the outer, angle of the eye. A vertical incision was then made from the centre of the first incision, extending down to the vermilion border of the lip, but not sufficiently deep to enter the buccal cavity. The flap was then dissected up, and retained in that position by an assistant. The branches of the superior maxillary nerve were dissected out from the soft parts, and an opening made through the ante-

rior wall of the antrum by means of a large trephine. The nerve was dislodged from its bed in the infra-orbital groove by means of a chisel, and dissected out as far back as the posterior wall of the antrum. The trephine was again used to perforate the posterior wall of the antrum, thus making an opening into the spheno-maxillary fossa, and exposing the nerve at its exit from the foramen rotundum, and also Meckel's ganglion.

The nerve was then divided behind the ganglion, and a portion, two and a half inches in length, was removed. Very little hæmorrhage occurred during the operation.

The wound was allowed to remain open for an hour or so, until all oozing had ceased, the edges of the semilunar incision were then approximated with silver sutures, the vertical incision being left open for drainage.

September 29th, 9 A. M.—Patient feeling well; has suffered no pain during the night. Pulse 63.

Wound is ordered to be syringed out daily with a solution of carbolic acid (grs. ij to ℥j).

8 P. M.—Feeling well. Pulse 70. Slight oozing of bloody serum from wound.

September 30th.—Wound healing. No pain.

October 1st.—Slight pain in gums during the night. Patient is restless and uneasy. Has taken morph. sulph. gr. ½ at 1 A. M. Wound dressed with adhesive plaster, and two pil. cath. co. ordered.

October 3d.—Dressings reapplied. No pain. Slight discharge of pus.

October 6th.—Sutures removed. Wound healing.

October 16th.—Wound entirely closed. No recurrence of pain.

January 29, 1870.—The patient called at Dr. Wood's office, and reported herself entirely free from pain.

June 15th.—Dr. Wood is again called on by the patient. She states that she has had no more pain in the original situation, but that she has commenced to suffer from darting and lancinating pain at two points over the course of the inferior maxillary nerve. She was ordered five drops of Donovan's solution three times daily, and instructed to call again within a month.

July 20th.—The patient reports herself much better. She is ordered to continue the above treatment; and, if she does not continue relieved, to return and have an operation performed on the inferior maxillary nerve.

Since last notes the patient has not been seen or heard from.

CASE II.—Michael Doyle, aged thirty, Ireland, laborer. Five years ago the patient was suddenly attacked with severe pain in the upper lip, which extended up toward his left eye. This lasted one year. He knows of no other cause than sleeping on the damp ground, and being exposed while in the army. He had all the teeth extracted on the left side, with the exception of one each on the upper and lower jaw, but this afforded no relief. After lasting a year, the pain ceased spontaneously, and he was free from it for six months. It then returned again in the same place, and has remained ever since without intermission, but is subject to exacerba-

tions. On admission to Bellevue Hospital (January 29, 1870), he is suffering from facial neuralgia, affecting the whole of the left side of his face. The parts are not swollen; motion of jaw is limited; he has burning pain all the time. Health is generally good. Has had no injury of the head. His family history is good, never had syphilis.

Physical examination shows no evidence of organic disease of heart or lungs. He has been subjected to all the various remedies that have been suggested for neuralgia, but has received no benefit from any of them.

January 30th.—The patient was etherized, in the sitting posture, and Dr. James R. Wood made a curved incision extending from the left internal canthus downward outward, and upward, to malar process; from the convexity of this incision he made another small one extending down to near the angle of the mouth. He then dissected up the flaps, searched for the nerves, tracing them through the infra-orbital foramen to the main trunk. On reaching the bone, he peeled off the periosteum, and with a small trephine removed a disk of bone from the anterior wall of the antrum; then, with a chisel and a pair of strong scissors, he broke through the infra-orbital canal—following the superior maxillary nerve—and again trephined the posterior wall of the antrum; then, tracing the nerve to the foramen rotundum with a pair of long-curved scissors, he severed the nerve, a small portion of Meckel's ganglion being attached to it. The edges of the curved incision were then approximated with silk sutures and adhesive straps, the vertical incision being left open, as in the other case, for drainage. Lint saturated with carbolic solution is laid over the whole wound.

February 1st.—Patient is doing well; moderate discharge from lower angle of wound, which is to be syringed out daily. Sight is perfect in left eye, but the conjunctiva is somewhat congested.

February 23d.—The wound has now entirely healed, leaving but a small cicatrix. He suffers no pain, but says the left side of his face feels "numb." Sensation is entirely gone from left half of nose and left half of upper lip.

March 20th.—The neuralgic pains are again returning with considerable violence at a spot a little to the left of the median line of the chin, and at a point midway between angle of jaw and malar process. He requires large hypodermic injections of Magendie's solution to enable him to sleep.

April 15th.—The neuralgia having returned in the inferior dental nerve with all its original severity, another operation was determined on. The patient was etherized, and Dr. Wood made an incision about two inches long over the body of the lower jaw, trephined the jaw in two places, and with a gouge removed the bridge of bone between the holes left by the trephine, thus exposing a portion of the inferior dental canal. He then dissected out an inch and a half of the nerve. After this a bistoury was introduced into the mouth, and the nerve divided just as it enters the inferior dental canal.

April 20th.—Wound is healing kindly. Patient has experienced no neuralgic pain since the operation.

May 2d.—The wound is entirely healed. He has no pain whatever, and he is discharged from the hospital.

A letter received from the patient, dated December 1, 1870, states that he is perfectly well, and that he has not had the slightest return of neuralgic pain since the second operation.

Proceedings of Societies.

MEDICAL SOCIETY OF THE COUNTY OF NEW YORK.

Stated Meeting, May 1, 1871.

DR. ABRAM JACOBI, President, in the chair.

THE reports of the Committees on Intelligence and Meteorology having been read, Dr. KRACKOWIZER presented to the Society a specimen showing a rare sequel of ulceration of the vermiform process, and detailed the points of interest in the case in substance as follows:

The specimen present was taken from the patient to whom he referred at a former meeting, in whose case the diagnosis was not made out. A boy, between eleven and twelve years of age, strong and healthy, went with his parents on Sunday, August 12th, of last year, to Fort Lee. On his return home he was as well as usual, but was taken soon after with vomiting and purging; a neighboring physician was called in, and by the administration of common remedies the immediate symptoms were relieved, and on the following day the patient took a dose of castor-oil. For two weeks the boy was unwell, the movements of his bowels being irregular in character and frequency, his mother saying that he sometimes voided a ropy, glairy substance. He suffered considerable pain in the abdomen, but after a little rest and quiet it passed nearly away, returning again, however, on his attempting to take exercise. Dr. Krackowizer was called to see him on the 29th of August, and, after prescribing for the immediate symptoms, the patient had no more vomiting or purging. The doctor had occasion to

see him again soon, however, and found him in bed and suffering from high fever and tenderness in right hypochondrium, where there was a feeling of fulness and rather more dulness on percussion than in other parts of the abdomen. He had then been two days without a stool. Chills, followed by fever, and profuse sweating, were of daily occurrence. From the symptoms presented, Dr. Krackowizer diagnosed catarrhal inflammation of the intestine, and again prescribed castor-oil. The day following its administration there was some tenderness remaining, but he had no fever. The next day he had fever, and more of the passages above described, and the doctor suspected that he might have contracted malarial poisoning during his trip to Fort Lee, and accordingly prescribed three grains of quinine, four times daily. The symptoms now remained stationary for about a week, the patient taking during that time another dose of castor-oil. The pain in the abdomen rather increased, and dulness of the right side on percussion was more marked. The fever continued irregularly, and the doctor commenced to doubt the correctness of his diagnosis. By the end of the week his attention was first directed to the vermiform appendix. On the 9th of September the patient was much worse, and the doctor suspected that it was due to improper diet, although he could not verify it. A dose of castor-oil brought away a stool containing the seeds and pulp of an orange. September 10th, no fever, tympanitis, or tenderness, and the doctor began to think that his diagnosis of catarrhal colitis was correct. He then had occasion to be absent from the city for a couple of days, and on the evening of his return he found the condition of the patient worse, he having become jaundiced and passed clay-colored stools; furthermore, the urine contained bile. The day following, more clay-colored stools were passed, and the pain and tenderness extended as high as the lower ribs and were increased in intensity. In consultation with Dr. Zinsser it was concluded that the patient was suffering from an inflammation originating in the mucous membrane of the colon, which had involved the submucous tissue and a limited amount of the peritonæum, and manifested a disposition to eruptions of in-

flammation of the adjacent peritoneal covering. The opium treatment was adopted.

On the 13th of September, a tumor, sharply defined and a little smaller than a hen's egg, could be detected in the region of the pylorus. It was hard and tender, and from its character and other symptoms the doctor feared it to be dependent upon the presence of a foreign body, which the patient had swallowed, and which had forced itself thus far into the duodenum, and, having caused a considerable degree of local inflammation, was in danger of passing into the cavity of the peritonæum. The administration of opium was imperative, as a suspension of it caused an aggravation of the symptoms.

Moderate fever continued, the patient becoming emaciated, and finally he died, vomiting and tympanitis supervening during the last day.

On *post-mortem* examination no general peritonitis could be found, but there was considerable local peritonitis on the right side, the mesentery being drawn over to that side, and a portion being adherent. An attempt to detach it by pulling caused it to separate at the point of its attachment, and in so doing a large abscess was laid open.

There were numerous abscesses of the upper surface and outer edge of the liver, and extensive adhesions between the mesentery and transverse colon. The abscess above mentioned was the tumor detected before death, and was situated behind the upper portion of the transverse colon, just before it becomes transverse.

The tissue of the liver was filled with abscesses dependent upon embolism, but the blood-vessels were not followed out in the examination to the points where this took place.

The caput coli and portions of the ascending colon and small intestine were removed, and on careful examination the abscess was discovered to have formed in the connective tissue posterior to the ascending colon, at the point where it was not covered by the peritonæum, and its cavity communicated with the cavity of the colon, the shreds of mucous membrane which were found hanging to the mouth of the opening proving that the abscess had formed outside of the intestine, and rupture had occurred into the latter, and that it was not the result of

disease originating in the mucous membrane. The vermiform process was not easily discovered, but, on making a slit through the wall of the colon, the opening into it was found and a probe passed into it. The appendix had become displaced from its normal site and lay upward and behind the ascending colon, to which it had become attached, being involved in the abscess which is above described, only about what would normally be one-half of the appendix remaining. It was due to its location that it could not be detected through the wall of the hypogastrium before death. A pouch-like process from the colon proved to be a dilatation of the colon itself, and not the caput coli, as was supposed. A portion of the small intestine was also adherent to the colon.

Dr. Henry B. Sands then read the paper on "The Use of the Plaster-of-Paris Bandage in the Treatment of Fractures," which appears in another portion of this number of the Journal. A man, to whose arm and shoulder this mode of dressing had been applied, for the sake of illustration, was afterward presented to the Society, together with specimens of the bandages used in different stages of preparation, etc.

Dr. Gurdon Buck expressed his surprise at the small average amount of shortening reported in fractures of the thigh, which surpassed that obtained by any other mode of treatment with which he was acquainted, including that method which was commonly known by his name. In the report of one hundred and forty-nine cases treated by the latter method, which he had presented, some of which had resulted absolutely without shortening, the average shortening in patients over fifteen years of age was five-eighths of an inch; in those under this age three-eighths of an inch, but Dr. Sands's results were superior to these. He had regarded this method as best adapted to such fractures as had no great disposition to displacement, such as those of the humerus, leg, etc. It had not been his practice to apply it in very recent injuries, and he had never used it in a case of fractured femur. He thought that this method of first enveloping the limb in cotton-bats, or flannel, had the recommendation that, in addition to giving perfect support, it admitted, by its elasticity, of a moderate and limited amount of swelling. He wished to ask the doctor

if cases of fracture of the cervix femoris, where the shortening which resulted fell short of one inch, were not likely to have been impacted? In such cases it was, in the judgment of experienced surgeons, improper to make forcible attempts at extension. He had known of instances in which this had been done, but in his own practice he had never aimed to do more than exert a moderate degree of force. He had observed that one such case of fracture of the cervix femoris, mentioned by the doctor, had no resultant shortening.

There was one danger which he feared might attend the employment of this method, viz.: The patient, being allowed to go about, might be careless and neglect to use his crutches, and might thus produce displacement of the fragments. He hoped to be soon able to try the method himself.

Dr. Sands supposed Dr. Buck referred to the case of the man aged sixty, which, however, was not a case of impacted fracture of the cervix.

Dr. Buck thought that an extra-capsular fracture of the cervix femoris must of necessity be impacted when occurring as the result of a fall on the great trochanter, the fracture taking place through the axis of the cervix, and the cervix being driven into the cellular texture of the trochanter, the shortening which commonly resulted being from one-half to one and a quarter inch, generally less than one inch. In these cases rotation outward is free, rotation inward is painful and difficult. Crepitation is not generally to be detected, nor shortening. He recalled a case in which at first he had no crepitus nor shortening, but shortening occurred afterward.

Dr. Sands by no means advocated the reduction of an impacted fracture, but there were two varieties of extra-capsular fractures of the cervix femoris, and the impacted variety he thought was the most rare. The signs of simple extra-capsular fracture were well marked by the shortening, eversion, crepitation, and helplessness—in the impacted variety the patient being able to make some use of the limb, whereas in the unimpacted variety he cannot do so, and in the latter the amount of shortening is greater than in any other form of fracture of the thigh-bone.

Dr. Post acknowledged his surprise at the results, and

would not have been disposed to place confidence in their correctness had they been reported by a less accurate and trustworthy observer. An introduction of this method into general practice with equally good success would constitute an era in the treatment of fractures. He thought the method used by Dr. Sands an improvement on the one heretofore employed. He also thought the views of Dr. Sands with regard to the impacted fractures of the cervix were correct. The opinion of Robert Smith, of England, was that, theoretically, they are all impacted at the outset, but in a large proportion of cases the surplus of force splits the trochanter and liberates the fragments.

Dr. Krackowizer had no experience with this method in fracture of femur, having had good results from the use of Buck's method. Will improve the earliest opportunity of following Dr. Sands's suggestions.

Dr. Knapp then presented to the Society three exceedingly interesting cases of blepharoplasty. In the first case the disease, which was rodent in character, commenced sixteen years ago, and at the time of the operation consisted of a flat, circular ulcer, at the inner corner of the right eye, the eyelids being pretty well preserved. Two flaps were taken, one from the forehead, the other from the cheek, and were stretched toward each other, their edges being brought together, at about the original site of the inner canthus. Care was taken to unite the inner edge of the lower lid to the middle of the flaps, and to stitch the flaps to the periosteum. The lids can now be opened and closed, and there is no lachrymation. When formerly he could use only one, he can now employ both eyes, which, considering the use of binocular vision in aiding the measurement of distances, is of great value to him.

Case number two was of epithelioma of the lower lid, extending to the cheek. Care was taken to remove every thing which was diseased, including the membranous portion of the lachrymal sac, and cleaning the wall of the orbit. The flap was taken from the forehead, was fifteen lines broad, and was united to its new site by a large number of stitches and suture-pins. Union took place by first intention. The eye lachrymates of course, and the flap has contracted considerably.

To relieve the former trouble, the lachrymal gland may be extirpated, an operation not attended with danger, but which will probably be unnecessary in the present case. The eye is perfect, and the patient can close the lids during sleep. There is but little mucous membrane remaining on the lower lid in this case.

The third was the most extensive successful case of blepharoplasty Dr. Knapp had known recorded. It was one of epithelioma of the lids, the eye not being involved. Both lids and the inner canthus were gone, and the disease was extending to the nose. Three flaps were formed in this case; the upper one was by twisting from the forehead, the under one from the cheek by the method of sliding, and the third from the nose.

If necessary to the success of the operation, he would prefer to close the eye, depending upon making a palpebral fissure by a subsequent operation. The patient now sees pretty well with this eye, and there is mucous membrane on both lids.

NEW YORK ACADEMY OF MEDICINE.

MALIGNANT DISEASE OF THE OVARIES. A CLINICAL CONTRIBUTION TO ITS DIAGNOSIS.

At the March meeting of the New York Academy of Medicine, Prof. T. G. Thomas read a very instructive and interesting paper on this subject, from which we make the following extracts. The paper is published in full in the *American Journal of Obstetrics* for May.

After stating the object of his paper, Prof. Thomas described the pathological anatomy of cancerous diseases of the ovaries, and submitted the following classification, based upon the descriptions made by the best authorities on this subject:

1. The ovary may be affected by true scirrhous degeneration. This form of cancer is decidedly rare, occurs usually in advanced life, and generally creates a tumor not larger than a large orange. It develops slowly, and presents the physical appearance of scirrhous disease in other organs. It may be a

primary malignant development, or it may occur in the ovary secondarily, its primary development having been previously recognized in some other part of the system.

2. The ovary may be the seat of medullary cancerous deposit, which may originate in the vesicles of De Graaf, in a corpus luteum, as Rokitansky once saw it do, or in the stroma of the organ. Distention sometimes causes rupture of the tunica albuginea of the ovary, and then exuberant medullary growth develops in contact with the peritonæum and abdominal viscera.

3. Scirrhous or medullary cancer may alone, or united, attack the wall of a cyst, and develop either as an endogenous or exogenous production. The cancerous matter so completely invades the cyst walls in some cases as to make it appear that cystic degeneration had occurred secondarily to its deposit.

4. From the wall of a cyst, vascular, arborescent villi may project, lining the cavity, and in time filling and extending it so as to cause the rupture of its walls. Then the exuberant cancerous element develops and secretes in immediate contact with the peritonæum, and produces either a dangerous peritonitis, or abundant abdominal dropsy.

With this form of cancer colloid degeneration is often associated, when it constitutes that variety which has been described by Cruveilhier as alveolar cancer.

The author then narrated in detail a number of cases serving to show the difficulties surrounding the diagnosis as well as to bring forward the more prominent symptoms characteristic of malignant disease. From the consideration of these he comes to the following conclusions, which may be accepted as a summary of his views:

The circumstances which most prominently point to the development of the disease are:

1. The rapid development of a solid tumor in an ovary; with—

2. Marked depreciation of the strength, vital forces, spirits, and general condition of the patient.

3. The occurrence of œdema pedum, and spanæmia, at an early period, and consequently dependent upon a general blood state, and not the consequence of pressure by the tumor

4. Lancinating and burning pains through the tumor.
5. Cachectic appearance.
6. The occurrence of ascites without evidences of scirrhosis or other hepatic disease, organic disease of the kidneys or heart, or chronic peritonitis—the fluid accumulating in such large amounts as to force aside the supernatant intestines and produce dulness in place of resonance, on percussion in dorsal decubitus.

Cystic degeneration of the ovary sometimes advances with great rapidity, and is accompanied in its course by rapid emaciation, marked physical prostration, ascites, and a cachectic appearance. It may be asked whether a case thus complicated would not present the very conditions which have been pointed out in this essay as furnishing grounds for the diagnosis of malignant disease. Unquestionably it would; but let it be remembered that, while these symptoms are mentioned as valuable aids to diagnosis, I do not pretend to maintain that they will always enable the diagnostician to avoid error. Again, in citing ascites with a small tumor as a most important symptom of malignant ovarian disease, I do not allude to slight or even moderate effusion with a large growth, but a markedly disproportionate amount of fluid, a great deal of abdominal effusion with a very small tumor.

Besides the condition just mentioned, there are two others which may create difficulty in differentiation from ovarian cancer: one is pregnancy in the middle or latter months, complicated by peritoneal effusion; the other a uterine fibroid existing with cirrhosis of the liver, with its attendant dropsy. The first may generally be known by its characteristic symptoms; while the second, although it might be recognized by the physical and rational signs of uterine fibroids and of cirrhosis, would very likely give considerable trouble in diagnosis.

When difficult and obscure cases present themselves in which a positive diagnosis becomes impossible by ordinary means, paracentesis or explorative incision should be resorted to rather than that the patient should be deprived of the prospect of cure held out to her by ovariotomy. Very often the most doubtful case may be satisfactorily settled by evacuating the abdominal effusion and passing the index-finger through a

small opening in the peritonæum, so as to touch the morbid growth. In certain rare cases, such a one, for example, as Case II. of the essay, even this would not suffice to remove all doubt.

Reports on the Progress of Medicine.

MATERIA MEDICA.

BY LEROY M. YALE, M. D.

1.—*Alcohol.*

The discussion of the therapeutical value of alcohol has lately been unusually interesting, owing to the carefully-conducted physiological experiments bearing upon the point. Unfortunately, however, they have brought us no nearer a conclusion. Thus, the experiments of Binz and Bouvier, published a year or two since, gave as the most noticeable results: that alcohol dilates the capillaries, and *uniformly*, in doses of whatever size, lowers the temperature of the body. The recent experiments of Drs. Parkes and Count Wollowicz militate against this view. The *Medical Times and Gazette*, July 23, 1870, thus gives the main points of their conclusions:

Our physiologists made experiment on a healthy and intelligent soldier, aged twenty-eight, of medium height and weight. The first step was to get him into a state of equilibrium on a simple and nutritious diet, every item in which was weighed, and its nitrogen estimated; and, during the eight days which passed in this way, the soldier drank watery liquids only. During the next six days, the diet being the same in all other respects, he took alcohol—on the first day one, on the second day two, four, six, and eight fluidounces of absolute alcohol respectively. Then for six more days he took water only. Next, for three days, twelve fluidounces of brandy daily (equal to six of absolute alcohol); and lastly, for three more days, water again. Thus, during twenty-six days, other things being equal, the man was subject, during two periods of six and three days, to the action of two forms of use of the most potent agents. What was the result? What is the normal action of alcohol on a healthy man? Let us take each item: 1. The *weight*, estimated twice daily, was unaffected. 2. The *temperature*, taken both in the axilla and in the rectum, was not appreciably altered, though what alteration there was was on the side of a slight increase—certainly there was not any lowering of the temperature. On the contrary, the patient on two days, while under the influence of eight ounces of absolute alcohol daily, had a slight feverish attack from chill which raised the temperature. Anyhow, our experimentalists contribute no support to the proposal to use alcohol as a reducer of febrile heat. 3. The marked effect of the alcohol was on the *circulation;* it increased the number of beats of the heart thirteen per cent., and increased the mechanical work done by it one-fifth. 4. The *elimination* of nitrogen by the urine was unaffected; there was no evidence of increased combustion, or of retarded metamorphosis of tissues. 5. The same with reference to phosphoric acid. "If," say our experimentalists, "the amount of this acid be any measure of the waste of nervous tissue (*which we do not affirm*), then these

experiments do not warrant any assertion that alcohol interferes with such metamorphosis." 6. The *alvine* excreta are as little affected as the urinary. 7. The evolution of carbon by the lungs was not determined, for our authors preferred no determination to any thing short of the accuracy attainable by Pettenkofer's method, which they were unable to employ. 8. On the subject of the *elimination* of alcohol by lungs, skin, urine, and bowels, our authors affirm the fact of some elimination, and seem inclined to lay more stress on the probability of Durand, Perrin, and Leroy's elimination theory than some other observers have conceded; but they are not able to say whether *all* the alcohol is eliminated or some destroyed. 9. A smaller quantity of alcohol in the form of brandy seems as potent as a larger quantity of absolute alcohol. 10. "One or two fluidounces of absolute alcohol given in divided doses in twenty-four hours to a perfectly healthy man seemed to increase the appetite; four fluidounces lessened it considerably, and larger quantities almost destroyed it." 11. The authors recognize the great practical use of alcohol in rousing a failing appetite, exciting a feeble heart, and accelerating a languid capillary circulation; yet, they lay emphasis on the fact that by an overdose the appetite may be destroyed, the heart unduly excited, and the capillary circulation improperly increased. Lastly, they repudiate the idea of applying to wine and beer any inferences drawn from the behavior of pure alcohol and brandy.

Still further, Prof. Cheever (*Michigan University Medical Journal*, November, 1870) gives the result of his experiments to test the effect of alcohol on the animal temperature:

These experiments were thirty-four in number, six upon animals, and twenty-eight upon man. The animals employed were a cat, a rabbit, a pigeon, and a dog. The experiments on these animals were conducted as follows:

The temperature of each was taken in the rectum. A catheter was then passed into the stomach and a quantity of water, equal to that of the alcoholic liquor to be used subsequently, was introduced. The temperature was then taken every fifteen minutes to half an hour for the next two hours. The animals having been allowed to rest six hours, the temperature was again taken in the rectum, and then from ʒj to ʒ iv of brandy (according to the animal), well diluted, was introduced into the stomach, and the temperature taken every fifteen to twenty minutes for about three hours. The conclusions arrived at were:

1. That non-narcotic (non-poisonous) doses of alcoholic liquors do not materially affect the body-temperature of animals.

2. That narcotic (poisonous) doses of alcoholic liquors do *lower* the body-temperature of animals.

Twenty-eight experiments were made upon seven young men, whose ages varied from twenty to thirty-four years.

The body-temperature, air-temperature, and pulse, were noted every half hour for a number of days. Then the following doses were given immediately after taking the air-temperature, body-temperature, and pulse, viz., ʒ ij to ʒ iv of alcohol, ℥ j to ℥ ij of brandy, ℥ ij to ℥ iv of sherry wine, Oj of best stock ale. These were given usually midway between meals, or after digestion was well advanced. The alcohol and brandy were diluted, the wine and ale were not. Two of the experiments were made in this way: The body-temperature, etc., were taken every half hour or hour for one day. The following day ℥ ss of brandy was given every two hours and the body-temperature, etc., taken as on the day before. The following are essentially the conclusions arrived at:

1. That non-narcotic doses of alcoholic drinks but slightly affect the body-temperature of man.

2. That the effect produced varies with persons and with the kind of alcoholic liquid employed.

3. That the change in temperature is not sufficient alone to serve, in any case, as a guide to the therapeutic application of the remedy.

In the *Practitioner* (April, June, August, September, October, 1870), the editor gives a series of articles on the "Dietetic and Medicinal Use of Wines." As Dr. Anstie has given so much attention to the indications for the use of alcohol, his opinions in the matter are well worth considering. We subjoin, therefore, an abstract of these articles:

Regarding the *dietetic* use, the following conclusions are given: That, for daily use, wines should not contain more than ten per cent. of absolute alcohol; still weaker wines are preferable. But one kind at a time should be used. All things considered, the red Bordeaux wines are best. The Rhine wines are equally good, but more costly. Hungarian and Greek wines are uncertain and dear. "The fortified wines, as a class, develop no proper vinous qualities till they have been some years in bottle. Sherry, however, is greatly superior to other wines of this class, in the rapidity with which it develops the volatile ethers. Fortified wines in small quantities are the appropriate stimuli of certain kinds of infantile and youthful debility and of the enfeebled nervous systems of old persons." From puberty to twenty-five or thirty years of age, in ordinary cases, alcohol is not advisable as an article of diet.

These conclusions follow the consideration of wines with regard to alcohol strength, natural acids, sugar, and ethereal constituents, which last are justly counted as of much value.

In regard to the giving of wine in *acute febrile disease*, the recommendations are: 1. That in most cases where alcoholic drinks are demanded at all the alcohol is the ingredient desired; therefore, spirits-and-water will be quite as good as wine; but 2. In cases where great exhaustion of the heart and sleeplessness, etc., are the prominent symptoms (e. g., the later stages of typhoid fever and the form of insanity known as acute delirium), the highly-etherized wines are of great value. 3. In catarrhal inflammations, the effervescent wines of weak alcohol strength (six and seven per cent.) will often materially aid the recovery.

The *non-febrile acute diseases* in which the writers esteem wine of value are: 1. Certain hæmorrhages, e. g., *post-partum* hæmorrhage and passive menorrhagia. 2. The acute neuroses, such as the irritable nervous condition at dentition, acute chorea, but rarely in neuralgia. 3. True shock collapse.

The *chronic diseases* calling for the administration of wine are given as being: 1. Debility produced by failure of primary digestion, being essentially nothing but nervous depression. Beaune (Burgundy) of about fourteen per cent. absolute alcohol, four to eight ounces per diem, is recommended as the ideal stimulant in these cases. 2. Occasionally in hydræmia, very rarely in chlorosis, or in absolutely unavoidable loss of sleep. 3. In a small number of cases of phthisis, and in some of the wasting diseases of childhood; in the latter case with iron or a vegetable bitter. 4. Chronic neuroses should be treated with alcohol only in advanced life. 5. In chronic mucous discharges, especially leucorrhœa, alcohol should be avoided or given with great circumspection. 6. In suppurative diseases the use of strong wines with quinine is the best plan of treatment.

Still further, recently, several of the London medical journals, following the lead of a somewhat sensational article in the *Saturday Review*, unite in denouncing the unrestricted use of wines by young women, as a fruitful cause of disease, aside from the moral effect of such a course.

2.—*Anæsthetics.*

Mr. C. Bader (*British Medical Journal*, January 29, 1870) gives the statistics of anæsthetics administered in the Eye Department of Guy's Hospital from February 2, 1862, to December 10, 1869. The following paragraph contains some useful suggestions:

Besides watching the patient's cheeks, lips, etc., attention should be paid to the color of the blood which flows; if this turn black suddenly, the chloroform or methylene should be removed. The patient, when struggling, should *never be resisted;* he should be allowed to do so while continuing to give the anæsthetics.

Signs of Danger.—Among the 3,224 chloroform cases, 45 are reported as having become blue in the face and stertorous suddenly, with the breathing and pulse irregular; 7 are stated to have become pale suddenly, with respiration and pulse stopping (to several is affixed the remark "apparently dead"). In all these cases the chloroform was removed at once, and the patient *slowly and gently turned on his left side*, to cause the region of the heart and the left side of the face to rest upon the couch. Experience has shown that this turning the patient should be done *slowly and gently.* Whether the support given to the heart or a change of position of the tongue, or some other change, be the cause of the cessation of the dangerous symptoms, I cannot say. During the many struggles with patients in danger, the fact of rapid recovery of patients when placed on the left side was observed accidentally. For the last six years it has been the sole means adopted in cases in danger; the administration of chloroform, the patient resting on the left side, was resumed as soon as the respiration had become strong and regular.

Mr. C. J. Fox (*Lancet*, April 30, 1870) claims for nitrous oxide preference for general use in surgery for the following reasons:

1. Its safety.
2. The rapidity with which anæsthesia can be induced—viz., from fifty to one hundred seconds.
3. The readiness with which a patient can either be kept for a prolonged period in the anæsthetic state, or, if the surgeon so wills, can be promtply and thoroughly awakened.
4. Because it is actually pleasant to the patient to inhale, and, therefore, much fright and mental distress are avoided, diminishing the danger of death by syncope.
5. Because the recovery is usually bright, pleasant, and complete, any after-discomfort being extremely rare.
6. Because sickness has never, to my knowledge, occurred during the administration of this anæsthetic, and but *rarely* afterward.

In the same number is a report of Dr. Richardson's remarks on methylic ether, which he regards as the best agent for producing rapid anæsthesia. This conclusion he reached after experimenting with eight or ten of the best known anæsthetics.

He prefers a solution of methylic ether in ethylic ether, which latter will take up more than one hundred volumes of the methylic-ether gas. The mixture he then styles methyl-ethylic ether. The anæsthetic, he thinks, is not perfect, but is, for short operations, the nearest to perfection of agents yet known.

Bisulphide of Carbon.—Dr. Cowling (*American Practitioner*, April, 1870) calls attention to this rather neglected but really efficacious local anæsthetic. Our own experience is confirmatory of Dr. Cowling's, as to its value in relieving pain of a neuralgic character.

3.—*Hydrate of Chloral.*

The past six months have produced a multitude of articles bearing upon the therapeutic value of this recent addition to the *Materia Medica.*

Prof. S. G. Armor (*Michigan University Medical Journal*) gives the following conclusions in regard to its action. We give them entire, as they seem to us, in the main, to be very just:

1. Although a valuable sedative in cases of morbid wakefulness and general irritative action of the nervous system, it cannot always be relied on as a substitute for many of the old and well-tried anodynes and nervines of the *Materia Medica.*

2. In a certain proportion of cases it produces unpleasant symptoms, such as gastric distress, difficult breathing, partial paralysis of the organs of deglutition, great restlessness, and sometimes coma. These are largely exceptional, however, to its general action.

3. These unpleasant symptoms are, in many cases, obviated by administering an opiate in small sustaining doses to the nervous system before administering the chloral—say, one-twelfth of a grain of morphine, or its equivalent of some other preparation of opium. The action of small stimulating doses of opium, administered twenty or thirty minutes before the chloral, appears to be antagonistic to its sometimes depressing effects.

4. The action of chloral is somewhat peculiar on the brain: it intensifies the action of alcohol by adding to its intoxicating properties. Great care should be exercised, therefore, in administering both agents at the same time, and in administering chloral with chloroform or ether.

5. It also intensifies the action of the so-called "*delirients*" of Headland, namely, belladonna, hyoscyamus, and stramonium. Full doses of neither of these articles should be administered with full doses of chloral.

6. It is very sensitive to certain chemical reagents, especially those of organic origin. It should not, therefore, be allowed to stand long dissolved in syrups; nor should it be combined in any mixture containing organic matter. It should be dissolved in simple water, and, like all salines which act by absorption, should be well diluted either before or after taking.

7. It should never be administered on a full stomach, neither an empty one; intermediate periods are better. A good rule is, to select a period when the stomach is empty, and have the patient take a small crust of bread, or a cracker, ten or twelve minutes before taking the chloral.

8. Its action is somewhat transient. In two or three hours the dose

must be repeated if the first produces no effect, or if we desire to protract the action of the drug. In urgent cases two or three doses can be administered at shorter intervals.

9. The dose varies in proportion to the amount of nervous irritability, or morbid wakefulness. Eight or ten grains, repeated every hour, or a larger amount every two hours, until twenty or thirty grains are taken, is usually sufficient to secure the specific action of the drug; although in severe cases much larger doses may be administered with safety. In a severe case of delirium, occurring during the progress of a continued fever, in which all the usual resources for securing sleep had failed, I advised that the patient take a drachm of the chloral at one dose. It had no other effect than that of producing quiet and refreshing sleep. The patient had taken several twenty-grain doses without any effect. These large doses, however, are not advisable, and should never be resorted to except in desperate cases, when other means and smaller doses had failed.

10. The protracted use of the drug is not advisable. It should be prohibited. It weakens the general vital forces, destroys the healthy tone of the nervous system, and tends to the production of anæmia.

Dr. Cairns, in a paper read before the Obstetrical Society (*Edinburgh Medical Journal*, October, 1870), concludes that—1. Owing to its action on the heart and lungs, it is hazardous in diseases of these organs. 2. Its effects are different in different persons, and even (3) in the same individual at different times. 4. That it is most useful in neuralgias, and that (5), as a pure anodyne or hypnotic, it is inferior to cannabis Indica or opium, or the alkaloids of the latter.

The discussion on Dr. Cairns's paper brought out quite prominently the inconveniences attending the use of chloral. The most prominent of these were derangement of the action of the heart and of respiration, and irritation of the eyes.

In the use of chloral hydrate the chief annoyance to the practitioner is the uncertainty which exists regarding the dose which shall produce physiological effects without the toxic accidents. Thus we find cases where two or three drachms have been administered at once, by design or mistake, with no result beyond producing profound, refreshing, and curative sleep; while, again, doses of less than a drachm have given rise to most alarming prostration, or maniacal excitement. Hence the prudence of comparatively small doses (ten to thirty grains), repeated till the effect is produced. Fortunately, this method of exhibition—according to the testimony of many physicians about whose experience we have inquired—is not only the safest but gives the best therapeutical results. The peculiar prostration is, in some cases, always present before the hypnotic effect is obtained; not, of course, in the frightful degree that has been alluded to, but to an extent that would be very annoying, save that the patients have learned to consider it as an evil necessary to the obtaining of the pleasant sleep which they are seeking.

As regards the application of the drug to special diseases, it would appear that, in no disease of which pain or irritation of the nervous system is a prominent symptom, has the use of chloral been neglected. As an anodyne, it has not proved sufficiently powerful to at all rival morphia. In the convulsive diseases, however, its value seems to be much greater; thus:

Dr. Oscar Liebreich (*Berliner Klinische Wochenschrift*, October 24, 1870) advocates its use in tetanus and trismus. He relates the case of a rheu-

matic person seized with trismus and tetanus, when a dose of three and a half grammes (fifty-four grains) produced complete relaxation of the muscular system in five minutes. This case suggested to the doctor the idea that chloral would be antidotal to strychnine, which he found to be the case. It is antidotal, however, only in the sense of preventing the spasm till, by oxidation or elimination, the strychnine is excreted. The chloral then must be readministered *pro re nata.* By this means Dr. Liebreich hopes to reduce cases of acute tetanus to the condition of chronic tetanus, in which the natural tendency is toward recovery, or at least recovery becomes the rule. He also claims that, with chloral, the patient's spirits are less depressed than with morphia, curare, etc. For rectal administration the dose need be no larger than by the mouth. The use by the rectum is specially applicable in tetanus, and only rarely does hypodermic injection become necessary; but if the latter method is adopted, abscess need not be anticipated when a pure neutral solution is employed. The best results come from full doses, say, two and a half to five grammes at once. Thus far Dr. Liebreich. Doubtless his judgment is correct as to the superiority of large doses in this disease.

The success following its use in tetanus seems to be considerable, after due allowance has been made for the great reputation always attending a new remedy, especially if it promises to cure an otherwise incurable disease. In the November number of this Journal appeared the report of a case of traumatic tetanus cured by chloral. In the same number the editor gave a summary of fourteen other cases, with nine recoveries. In a subsequent issue Dr. Badeau reported two cases, one recovery. Still further we have noticed a case cured by chloral and the continuous current (*Gazette des Hôpitaux*, No. 68), in which the galvanism seemed to play quite as important a part as the drug. Another case is reported by Mr. Tyrrell (*Lancet*, February 4, 1871), ending fatally. The patient took, in eleven days, seven hundred and seventy grains of chloral, with the effect of alleviating his sufferings, though not of preventing his death. The same was true of yet another case under our own observation. Four other cases have been noticed in the January number of the Journal. This gives a total of twenty-four cases, with fourteen recoveries.

Of its value in chorea the reports are contradictory.

The results in whooping-cough are negative, as the cases remain under treatment nearly or quite as long a time as is required for the spontaneous abatement of the paroxysms.

Dr. Macleod (*Practitioner*, August, 1870) is warm in its praise as a remedy in the paralysis of the insane, and in certain other forms of insanity.

Dr. J. H. Bennett (*Practitioner*, May, 1870) considers it the best hypnotic in phthisis, and shows in addition that it is antagonistic to the poisonous effects of Calabar bean.

Remembering the theory of the action of chloral, it would be anticipated that in rheumatism its power would be very

slight, or that excessive doses would be required. Yet we find (*Lancet*, November 20, 1869) especial efficacy claimed for the chloral in rheumatic pain, and in gout it is said to be *the* sedative. Again, Dr. Ogle states that, in rheumatism, no increase of dose is necessary. If these observations are correct, there is doubtless an error in the theory of the *modus operandi*.

Dr. Richardson, of London, and Dr. E. H. Clarke, of Boston, have both called the attention of the profession to the immense consumption of this drug, aside from those cases where it is ordered by physicians.

4.—*Bromide of Potassium.*

During the past year there have appeared, both in the *Lancet* and in the *Practitioner*, some analyses of specimens of bromide of potassium obtained from various druggists in London and other large cities of Great Britain. The amount of impurity is matter of surprise, ranging, in the *Lancet* cases, from 13.75 to 31 per cent. The commonest adulterations were chloride of potassium and sulphate of potassa, the former running as high as 24.93 per cent. in one instance.

Dr. Flint (*American Practitioner*) suggests the use of the bromide in *diabetes*, detailing some cases in which its use was followed by amelioration of symptoms. Dr. Moon (*Practitioner*, May, 1870) gives additional evidence of the value of the bromides in relieving the cerebro-spinal symptoms in *fever*. In the same journal, for November, Dr. Clouston's experience is quoted as showing the superiority of a mixture of bromide of potassium and tincture of cannabis Indica over other drugs, or the same drugs given separately, for quieting the excitement existing in many cases of *insanity*. The internal and external use of the bromide for *mammary tumors* is advocated by Dr. Osborne (*Medical Times and Gazette*, April 9, 1870). The *Dublin Quarterly*, August, 1870, quotes MM. Rabuteau and Bucquoy as to the efficacy of large doses of the bromides as eliminators of lead in *saturnine poisoning;* and mentions certain cases of M. Vulpian, in which the free use of bromide of potassium had caused ataxic symptoms and great prostration. The cases resemble, in some points, those published by Dr. Hammond some time ago (*Psychological Journal*, January, 1869).

5.—*Physiological Action of some of the Alkaloids of Opium, and Therapeutical Uses of Papaverine.*

W. Baxt [Gaz. Méd. de Paris, July 9, 1870] says:

1. The alkaloids of opium constitute a series of principles having two characteristic properties: a narcotic, and a convulsant tetanic action.

2. Each of the alkaloids possesses either one or the other only of these

characteristic properties; or both as the same time, in which case one of the two contrary actions becomes predominant, and masks more or less the other.

3. As a pure narcotic, papaverine ranks first; then follow with reference to narcotic property: morphine, narceine, codeine, etc.; the convulsant action gradually becoming more prominent, reaching its maximum in thebaine, and approximating, except in dose, this alkaloid to strychnine.

4. On the contrary, as to the convulsive and tetanic action, thebaine ranks first. Then in prophyroxine, narcotine, codeine, etc. The tetanic property decreases by degrees, while the narcotic action increases, to reach its maximum of intensity in papaverine.

5. Thebaine has an action identical with that of strychnine; but may be given in much larger doses. It could, therefore, be substituted with advantage for strychnia in therapeutics in all cases where the latter is indicated.

6. Papaverine acts like morphine as a narcotic; but it deserves the preference in practice, as it is free from some of the inconveniences so frequently following the administration of morphine.

7. Papaverine as well as morphine, acting directly in a manner contrary (*en-sens inverse*) to strychnine and thebaine, may be used with success as antidotes in poisoning by the last two substances.

8. Papaverine and morphine paralyze directly the peripheral extremities of sensitive nerves at the place of application, and may consequently be employed as local anæsthetics in neuralgies of different kinds without affection of the nervous centres.

9. The muscles as well as motor nerves are submitted to no functional alteration under the influence of papaverine and morphine.

10. Papaverine and morphine act principally in decreasing the reflex activity; they affect in the first place the peripheral extremities of sensitive nerves, perhaps afterward these nerve fibres in their course, and probably also the nervous centres.

11. Setschenow's reflex centres of arrest do not undergo any evident modification under the influence of these two alkaloids.

It will be seen that the results obtained by Baxt are completely contradictory of the experiments of Claude Bernard, at least as regards papaverine and narceine. In fact, Cl. Bernard, in view of the convulsive property, places papaverine side by side with thebaine, while, according to him, narceine is the only alkaloid of opium which has not this tetanic action. It is difficult enough to explain this contradiction. Must it be admitted, as Baxt believes, that the French chemists have made a mistake, and have furnished the eminent physiologist of the College of France some papaverine instead of narceine? It seems rather difficult to admit.

As regards the use of papaverine in therapeutics, the author, from his personal observations, made in the service of Griesinger, in the winter of 1867–'68, recommends, above all, the chlorohydrate of papaverine. The doses are about the same as of morphine, and must be used with the same care and in the same cases.

6.—*Apomorphia.*

Dr. F. M. Pierce (*British Medical Journal*, February 26, 1870) used this remedy in a case of chorea with good result. He extols it as an emetic. He briefly gives its method of manufacture, characters, and mode of administration, as follows:

A detailed account of apomorphia will be found in the *Proceedings of*

the Royal Society for 1869. It may suffice here to state that apomorphia is obtained by subjecting morphia to the continued action of pure hydrochloric acid at a high temperature for several hours. The base can be obtained from the resulting hydrochlorate of apomorphia, by dissolving in water, adding excess of bicarbonate of sodium, and extracting with ether or chloroform. In composition, apomorphia is morphia, *minus* an atom of water. In its chemical reaction, it is in nearly all respects different from morphia. It is soluble in cold, and to a greater extent in warm, water. In powder, it is of a snow-white color. The watery solution is colorless at first, rapidly changing to a dark-olive green, and, at the end of a few weeks, almost black. The cause of this evident decompositon is at present *sub judice*. Morphia is not reproduced. The physiological effects of the colored solution are the same, to a slightly-diminished extent, as of the fresh preparation, but rather more irritating to the skin. An increase of the dose is, therefore, required on repetition.

Briefly to indicate its therapeutic value, the chief character of the drug —its power of producing vomiting—was noticed to a very disagreeable extent during its preparation. Its absorption through the cutaneous surface produced in the manipulators lassitude, weakness, frequent headache, constant nausea, and occasional sudden attacks of vomiting. From some experiments made by Dr. Gee, one-tenth of a grain was considered the average dose for an adult. I have found this too large, whether of a fresh or an old solution. The desired effect is readily obtained from one-fifteenth of a grain, or less; vomiting occurring in from five to twelve minutes, the subsequent depression being slight and of short duration.

The solution which I have generally used consisted of a grain of hydrochlorate of apomorphia (the base being very unstable) dissolved in two hundred minims of water. Five minims of this preparation, or one-fortieth of a grain, was the dose generally administered to children, to whom I have frequently given it as an emetic. In nearly all the cases, it was administered subcutaneously. In private practice, the hypodermic use of drugs may appear a little formidable; but the more complete control of a drug thus acquired will probably in time out-balance the objections to this method.

7.—*Opium in Croup.*

Dr. J. S. Seaton (*American Practitioner*, March, 1870) warmly advocates the treatment of true croup by opiates, citing a number of cases in defence of his position. The treatment consists essentially in giving repeated doses of Dover's powder till the distressing symptoms are abated, and the administration of an emetic (ipecac.) as required.

8.—*Gelsemium.*

This drug is beginning to attract considerable attention from the profession, its use hitherto having been chiefly among the "eclectic" practitioners. It has enjoyed with them a great reputation as a febrifuge, and has been esteemed of value in rheumatism, neuralgia, etc. King ("American Dispensatory," pp. 381 and 1275) claims for it the power of causing uterine contractions, and of relieving dysmenorrhœic pain.

In the October number of the *Practitioner*, Dr. Roberts Bartholow gives the result of his experiments on its physio-

logical action, together with an analysis of certain cases of poisoning with the drug. The toxic symptoms he enumerates are: 1. Disorders of motility and sensibility—in warm-blooded animals the motor functions failing first, in cold-blooded animals the sensory. 2. Labored respiration, due to the paretic state of the respiratory muscles, especially the diaphragm. 3. Weakened action of the heart; its pulsations continuing, however, some minutes after the cessation of respiration, the enfeebling of the heart being due to the obstruction of the pulmonary circulation. 4. Dilated pupil, double vision, ptosis, occurring early, from paralysis of the third pair. 5. The intellect remains clear until near death, when carbonic-acid poisoning supervenes.

The physiological action he sums up thus: 1. Being a crystalloidal substance, gelsemiate of gelsemia, the active principle, is rapidly absorbed into the blood. 2. It has a selective action on the nervous system. 3. It acts chiefly on the motor portion of the cord. 4. Its paralyzing effect is due to its action on the motor centre, and not to an action on the peripheral nerve-fibres. 5. It acts also on the sensory portion of the cord, producing at last complete anæsthesia; but this effect, in warm-blooded animals and in man is toxic only, and follows the paralysis of the motor function.

A case of poisoning by gelsemium (given as an anodyne, by an irregular practitioner) is reported by Dr. J. G. Pinkham (*Boston Medical and Surgical Journal*, February 9, 1871), in which the symptoms were very nearly the same as those of Dr. Bartholow's cases. Dr. Pinkham considers his case as sustaining Dr. Bartholow's conclusion regarding the primary effect upon the respiration.

Dr. Bartholow thinks the action of gelsemium nearer akin to that of conium than to that of any other drug; and, further, that no antagonistic power is found to exist between gelsemium on the one hand, and strychnia, atropia, or physostigma, on the other. This statement regarding strychnia is worthy of notice as King (*op. cit.*) speaks of its being a reliable remedy in tetanus.

Dr. T. M. Woodson (*American Practitioner*, March, 1870) recommends the fluid extract of gelsemium, in conjunction with bromide of potassium, in headaches, especially the neuralgias of females.

Dr. E. P. Hurd (*Boston Medical and Surgical Journal*, December 8, 1870) thinks gelsemium the best cardiac sedative we possess, ranking it before digitalis, owing to its safety, while it is surer than veratrum viride or hydrocyanic acid. He gives, of the saturated tincture, three drops every two, three, or four hours, according to the urgency of the symp-

toms; in a severe case of aortic regurgitation, great relief was obtained from the repetition of this dose every two hours. Sometimes vertigo and nausea are produced. As a febrifuge, Dr. Hurd thinks gelsemium not better than veratrum viride.

9.—*Nitrite of Amyl.*

Dr. James F. Goodhart (*Practitioner*, January, 1871) has made a number of experiments to ascertain the effect of the nitrite of amyl upon the circulation. The doses inhaled varied from three to ten minims, in the latter case the inhalation being often suspended before the drug was entirely used; the time occupied being from fifty seconds to two minutes.

The chief effects he noticed were: 1. Within from three to ten seconds from the beginning of the inhalation, the pulse increased in frequency, rising rapidly in some instances from 70 to 160 beats in the minute. 2. In from fifteen to thirty seconds there occurred flushing of the face, denoting capillary dilatation, and coincidentally with it a fulness of the chest, and a tendency to cough, doubtless dependent upon the same cause. 3. Doses of eight or ten drops cause haziness of vision. 4. The after-effects were lassitude and headache, prolonged according to the size of the dose. The writer recalls the suggestion, by Guthrie, of the value of the nitrite of amyl as an excitant to the heart in emergencies; and alludes to the difference between the physiological effects he details and its influence in pathological states, where, according to Drs. Anstie and Brunton, the pulse became slow and full as the result of its use.

10.—*Iodine.*

Inquiry is often made regarding the composition of the "iodine caustic," and the "compound tincture of iodine," of Churchill. By the kindness of Dr. William Neergaard, we are able to give the formulæ as follows: Churchill's iodine caustic is composed of "iodine, one drachm; iodide of potassium, two drachms; water, half a fluidounce; mix." This mixture will be seen to be more than five times the strength of liq. iodinii co. of the U. S. Pharmacopœia, which it otherwise resembles. Churchill's compound tincture of iodine is: "pure iodine, two and a half ounces; iodide of potassium, half an ounce; alcohol, four fluidounces; rectified spirit of wine, twelve fluidounces; mix them." Each fluidounce of this tincture contains seventy-five grains of iodine, five times as much as the tincture bearing the same name in the U. S. Pharmacopœia.

The *Medical Times and Gazette* (September 3 and October 1, 1870) contains articles commendatory of the use of iodine (two grains of iodine and a little iodide of potassium to an ounce of water) as a topical application to wounds, of its use in syphilis as a gargle, and in form of an ointment externally to relieve the osteocopic pains in the shin-bones.

11.—*Iodine in Incontinence of Urine in Old People.*

Dr. Schmidt, of Münsterfield, having witnessed useful effects from the exhibition of iodine in incontinence of urine resulting from paralysis, determined to try it in other cases. An old lady, aged eighty, who had always enjoyed good health, and was very active for her years, was attacked at the age of seventy-six with dysentery, which very much weakened her. From this time the urine passed involuntarily, and for four years she suffered great misery in consequence; from her age her condition was looked upon as incurable. The author gave her one drop of tincture of iodine every hour, and the following day she was able to hold the urine, and she continued the medicine (every two hours one drop) for a fortnight, and with complete success. The discontinuation of the medicine for some time led to a return of the symptoms, which disappeared, however, directly the medicine was resumed. It was continued, therefore, with occasional suspension, for two years, when she died from the effects of a blow.

Another case was an old man, aged seventy-four, who had suffered for six months from the same affection. He was ordered pills, containing each $\frac{1}{10}$ grain of iodine. Immediate improvement followed; he was never quite able to do without the remedy. He died eighteen months later, from inflammation of the lungs.

12.—*Ioduret of Silver in Whooping-Cough.*

Dr. Bartlett (*Am. Practitioner*, February, 1870) recommends the ioduret of silver as a remedy for whooping-cough. He prepares it by adding a solution of iodide of potassium (one drachm to the ounce) to a solution of nitrate of silver (a drachm to the ounce). The yellow precipitate is well washed till the nitrate of potash is removed. For administration Dr. B. used the following formula: ℞. Arg. iod. ten grains, sacch. alb. seventy grains, pulv. gum. tragac. ten grains. Rub well together, moisten with a few drops of water, and make of the mass eighty pills. A child two or three years old should take one pill three to five times daily, just before or after meals. Children from six to ten years should take two pills for a dose. The doctor thinks that any one who will try the remedy

for a week will be satisfied of its great power in diminishing the paroxysms of the cough.

13.—*Sarsaparilla in Syphilis.*

Dr. T. Clifford Allbutt (*Practitioner*, May, 1870) comes to the rescue of this obsolescent remedy. He claims that the want of success generally met with is due to the use of too small doses. He describes its use at the Leeds Infirmary thus:

The remedy is used by us as a decoction, which is made in the infirmary in large quantities. Of this decoction, which differs only in unimportant details from the compound decoction of the Pharmacopœia, we administer from four to ten ounces three times a day, or prescribe some such quantity as a pint and a pint and a half to be taken at will during the twenty-four hours. This medication is expensive, no doubt, but that treatment is the cheapest which most quickly cures the patient. The cases in which sarsaparilla is most useful are cases in which the system is thoroughly infected with syphilis, during the tertiary and visceral modes of its appearances.

In persons who are in a thoroughly cachectic state, who have lost flesh and strength, and who are suffering from sluggish ulcerations and indolent gummata, the sarsaparilla is really of very great value. I believe there is scarcely a practitioner among my readers who will not rejoice to hear of a remedy which will help him to cleanse and to reëstablish old syphilitic patients—patients whose constitutions have been undermined by want of nourishment or by excesses, who have gone through many courses of mercury, whose irritable mucous membranes will not bear any more iodide of potassium, and who are so sallow, so worn, so broken down, so eaten up by disease as to seem fit only for the grave. These persons clear up on such quantities of sarsaparilla as I have named, and it is here that the drug fills so important a gap. It need not, and it will not, supersede mercury and iodide of potassium in straightforward cases, but it has its place where these means have failed, or where they are on some grounds to be avoided. How far we are right in claiming this important place for sarsaparilla can only be known after an extended use of the drug according to our method by the profession at large.

14.—*The Use of the Bath in Fever.*

Prof. Binz, of Bonn, the well-known therapeutical experimenter, writes to Dr. Herman Weber (*Lancet*, February 4, 1871) the result of his experience in applying the antipyretic treatment to typhoid fever in the army hospital, near Compiègne. He had about one hundred and thirty cases of mild type, and sixty of grave:

I could not hesitate as to the selection of the plan of treatment—whether the old stimulating (English) method; or the German expectant, as introduced, especially by the schools of Vienna and Prague, in reaction against the inundation with medicines; or the rational modern plan, which is the result of the use of the thermometer according to Traube's, Bärensprung's and Wunderlich's teachings. There can be no doubt that the majority of deaths from typhoid fever are caused by the continued high temperature.

This danger we can meet in two ways: first, by the more rapid abstraction of the heat already produced; secondly, by checking the production of heat. The former intention is carried out by the frequent use of moderately cold baths; the latter by the internal administration of antipyretic remedies, among which quinine occupies the first rank.

You are acquainted with the development of this method from Currie up to the present time, when especially Brand and Leibermeister, in Germany, have given it a scientific formula. As soon as one of my patients had in the morning above 101° Fahr., and in the evening above 103° Fahr., he was placed during fifteen to twenty minutes in a bath of about 77° Fahr., and every second day he received either in the morning or in the evening fifteen, and in severe cases twenty-three grains of quinine, dissolved in hydrochloric acid and water.

If I communicate to you the statistical results of this method, I do not think for one moment to tell you any thing new; I wish only to corroborate and to propagate a striking truth, which is, unfortunately, not yet generally acknowledged. If one has at once to deal with sixty serious cases of typhoid fever in otherwise strong young men, the conditions are too evident to allow deception. Of these sixty cases, I have lost to this time one case from peritonitis, two from intestinal hæmorrhage, and a fourth will probably become fatal through profuse diarrhœa, though the typhoid fever may be said to have passed. If I consider this case as fatal, the mortality is 6.6 per cent. As far as I remember, the mortality in the German clinical hospitals before the introduction of the antipyretic treatment varied from 12 to 25 per cent., but has been reduced by this method to a similar figure as the one obtained by us. To avoid misunderstanding, I repeat that the sixty cases in question belonged all to the *graver type*, while the others (about one hundred and thirty) were registered as mild typhoid fever. We may from this experience, at all events, draw the inference that, under a careful but persistent antipyretic treatment of typhoid fever, few patients, if any, will die of exhaustion in consequence of the febrile temperature continuing for weeks, and the causes of death will be restricted to less frequent complications.

The moderately cold bath and the quinine exercise, besides their immediate effect on the febrile temperature, a very beneficial influence on two other conditions important in typhoid fever. The frequent baths promote cleanliness, so necessary on account of the diarrhœa, and through this greatly diminish the tendency to bed-sores, which is further counteracted by the application of unguentum cerussæ, with camphor (twenty parts of the former to one part of the latter), to any patch of skin becoming red. The large doses of quinine administered in the evening have a calming effect, as well on the action of the "humors" as on that of the nervous system; and through this the nocturnal delirium, this horror of hospitals crowded with typhoid fever, was almost absent. If the effect of the cold bath on the "heated humors" had already diminished their tendency to irritate the brain, fifteen to twenty-three grains of quinine completed the calming influence; and thus we never required more than two night attendants in each of our typhoid wards, containing thirty patients. I ought to mention that all the patients received, after the bath, a glass of sherry or Marsala. This was done with the intention—1. To increase the cooling effect of the bath by the internal antipyretic remedy (alcohol), though it exercises, given in this way, only a transitory influence. 2. To revive the action of the heart, which is generally rather depressed after the bath. 3. To counteract the sometimes excessive feeling of cold, which is principally caused by the contraction of the cutaneous capillaries. In connection with this subject you will be glad to hear that two cases of Marsala supplied by

the depôt of the English National Society at Remilly have been especially useful in the treatment of these cases.

Dr. Ziemssen and Prof. Immermann give the results of their experience, derived from the hospital at Erlangen. They lay great stress on the necessity of carefully studying the daily curve of temperature in typhus, and base their observations on the results of hourly registration. From inquiries extending over 120 days, they find the maximum of daily fluctuation to occur from 4 P. M. to 7 P. M., and generally between 5 and 6 P. M. It occurred at the latter period in one-third of all the observations. The minimum occurred at about 6 to 8 A. M. When a double daily curve was present, the second maximum occurred between 12 and 2 P. M. The whole number of cases under observation amounted to 199, of whom 62 were treated with cold water. They consider a depression of 2° C. in the rectum, lasting for an hour, to represent a positive antipyretic effect; but when less marked, or lasting for a shorter term, as a negative effect. After the administration of 691 baths, a positive effect was observed in no less than 97.5 per cent. of all the cases. The effects produced by the baths augmented as the disease progressed, and the depression of temperature was particularly well marked on the fourteenth and twenty-first days. The protraction of the action of the bath was of good augury. Its action was least marked at the commencement of the daily exacerbation, and is prolonged as the period of daily maximum of temperature is approximated, when it is most marked, or between 6 and 7 P. M. They consider their experiments establish the facts that the hydropathic plan shortens the duration of typhus; and that when methodically applied it diminishes the mortality, though, if done irregularly and imperfectly, it exerts no influence at all upon the course or duration of the disease.—*Med. Chir. Rundschau.—Practitioner*, June, 1870.

Dr. Fahrsen (*Lancet*, December 31, 1870), writing from Dresden, reports equally good results from the same treatment in the hospital for fever patients sent from the front. Some portion of these patients in this hospital were women. Dr. Fahrsen saw 200 cases treated, with a mortality of four per cent.

In taking the temperature, the thermometer was placed in the anus in all cases, except the women, in whom axillary temperature was taken—the anal temperature being much more speedily and certainly obtained.

The use of water, chiefly in the form of a cold pack, has been revived in scarlatina (*Lancet*, July 16, 1870) and in relapsing fever (*Edinburgh Medical Journal*, July, 1870), with very considerable success.

We may mention in this connection the use of *salicine* in typhoid fever, from which great benefit is said to be derived. The curative action is dependent, it is claimed, upon the antiseptic power of the drug.

15.—*The Therapeutic Use of Chromic Acid in Affections of the Mouth.* Dr. Magitot [Bulletin de Thérapeutique] sums up an interesting paper with the following conclusions:

1. Chromic acid, by its powerfully destructive and modifying action, may, on account of the little pain it causes, be regarded as one of the most convenient agents in the cauterization of the mucous membrane of the mouth and gums.

2. It ought to be preferred to all other agents hitherto used in the therapeutics of the several forms of ulceration and chronic inflammation of the mucous membranes of the mouth and gums.

3. It must be looked upon as the caustic *par excellence* in the treatment of the alveolar periostitis.

4. In cases where it is intended to destroy organic productions of the buccal mucous membrane, it may, combined or not with the use of the bistoury, be preferred to the actual cautery and other deep caustics, by reason of the simplicity and innocuousness of its application.

The mode of its application is, namely: By means of a small flat stick loaded with a little of the solution, or even with one or two small crystals (beginning with a solution of equal parts of water and pure acid), the substance is applied easily to the diseased spot. The head is kept inclined for a moment on the opposite side, and the part touched is covered with a little cotton or lint.

Chromic acid does not cause pain nor irritation of the teeth, and the yellowish color produced by it disappears rapidly.

16.—*Lacto-phosphate of Lime.* We are indebted to Prof. B. W. McCready for the following note on the lacto-phosphate of lime:

There are strong grounds for the belief that, besides being a necessary ingredient of the hard parts of vertebrated animals, the phosphate of lime is intimately connected with the process of cell-formation. According to Lehmann, it is found in appreciable quantity wherever cells or fibres are formed, even in those inferior animals in the hard parts of which the phosphate is replaced by the carbonate of lime; it is more abundant in the plastic secretions from wounds than in the serum of the blood; it is less abundant in the venous blood derived from parts, as the muscles, in which the metamorphosis of tissue is greatest, than in that coming from parts of inferior vital activity.

The phosphate of lime has been recommended in various forms of imperfect or depraved nutrition, particularly in cases of rickets; and the experiments of Milne Edwards seem to show that, under its use, fractured bones in dogs and rabbits show a quicker and more abundant formation of callus. It, however, has never obtained the general confidence of the profession. In a series of articles in the *Archives Générales de Médecine*, for December, 1869, and for January and February, 1870, Dr. L. Dusart reviews the whole subject, and, attributing the unsatisfactory results heretofore obtained to the great insolubility of the ordinary phosphate, recommends the use of a new preparation, which he terms the lacto-phosphate of lime, in which the lime-salt is dissolved in free lactic acid.

M. Dusart finds—1. That the lacto-phosphate of lime injected through a fistulous opening into the stomach of a dog, during digestion, is not precipitated by the contents of the stomach, but remains dissolved in the chyme.

2. That in comparative experiments made on guinea-pigs, in which the bones of one of the extremities were fractured, that in the animals submitted to the action of the lacto-phosphated lime, the callus was more voluminous, and the consolidation of the bone more perfect, than in those submitted to a similar regimen, with the exception of the lime-salt.

3. In four cases of tardy union of bone observed in the Hôpital Beaujon, the administration of the lacto-phosphate was attended with marked improvement of the fractured part; in three of the patients, the appetite was at the same time greatly increased.

4. In a number of cases of rachitis, the influence of the lacto-phosphate was well marked, the children rapidly improving under its administration, the appetite at the same time being greatly increased.

5. Several cases of diarrhœa and indigestion, after resisting other treatment, quickly yielded to the influence of the lacto-phosphate.

At my request, Mr. W. Neergaard, pharmaceutist, prepared for me in June last a syrup, by dissolving recently-precipitated phosphate of lime in concentrated lactic acid, and then adding a convenient amount of syrup. I have found it useful—

1. In cases of defective nutrition, with or without diarrhœa, but without any acute disease of the alimentary canal, particularly when these conditions have occurred in prematurely weaned children.

2. In rachitis.

3. In atonic dyspepsia. In most of these cases, not only were the digestive power and nutrition of the patient greatly improved, but the appetite for food was augmented, sometimes to an extraordinary degree. Dr. William A. Hammond has found it of very great value in cases of nervous derangement, attended with impaired nutrition; and Dr. Barstow, of Sanford Hall, has used it largely in similar cases. It is very probable that the free lactic acid may, in many instances, contribute greatly to the efficiency of the preparation.

In forming the syrup of the lacto-phosphate, Mr. Neergaard obtains the phosphate of lime, according to the United States Pharmacopœia, by acting on bone earth with muriatic acid, and precipitating the dissolved phosphate with ammonia. He saturates an ounce of concentrated lactic acid with the recent precipitate, and to the clear solution he adds six ounces and a half of water, an ounce and a half of orange-flower water, and twelve ounces of sugar. Prepared in this manner, the syrup will contain from fifteen to twenty grains of phosphate of lime to the ounce. The variation in strength is caused by the want of uniformity in the strength of the lactic acid; that furnished by the best manufacturer—Merck, of Darmstadt—varying considerably in its degrees of concentration. The dose for a young child is one to two drachms three or four times a day, while an adult may take a tablespoonful as frequently. The taste is pleasantly acid, and the syrup is not apt to disagree even with delicate stomachs.

THE profession in Germany sustains another grievous loss in the death of Prof. Albrecht Wagner, of Königsberg. Like Niemeyer, he died of typhoid fever, contracted by exposure while in the service of his country. He was attached to the army of General von Manteuffel, as chief medical officer. Wagner was the author of a number of standard works on Resection and Regeneration of Bones and Nerves, Diabetes, Hydrophobia, etc.

Miscellaneous and Scientific Notes.

The connection of the undersigned with this JOURNAL expires with the present number.

During the five years that the editorial management has devolved upon me, my sole effort and aim have been to render the JOURNAL an acceptable and a creditable representative of the medical periodical literature of this country. As to how well or how poorly I may have succeeded in this respect, it would be unbecoming in me to express an opinion.

My successors, Drs. WILLIAM T. LUSK and JAMES B. HUNTER, bring to their labors a ripe experience and qualifications of a rare order, and for them I venture to bespeak, from the numerous friends and patrons of the JOURNAL, that same cordial sympathy and generous support which have been so freely extended to myself, feeling assured that in their hands the JOURNAL will reach a still higher level in our medical literature, and become even more worthy of substantial commendation and recognition.

EDWARD S. DUNSTER, M. D.

The New-York Hospital.—In the May number of the JOURNAL, Dr. Lente alludes to the strictures made by Dr. G. A. Peters, in his Alumni Address, on the destruction of this noble institution by the order of its Board of Governors. We present herewith the portion of the address referred to:

All now within the sound of my voice have doubtless gloried in the name and record of the New-York Hospital, chartered in the reign of King George III., July 13, 1771. The corner-stone was laid in 1773; but the building when almost completed was nearly destroyed by fire, February 28, 1775. During the War of Independence it was used for barracks, and was not in a condition to be opened as a hospital until January 3, 1791.

From time to time new buildings were erected upon the grounds, and the original building, known as the "Main House," was enlarged and improved. The elms planted a century ago flourished apace, shaded its grand old front, and gladdened the eye of every passer in the Broadway throng, be he bent on business or pleasure. Within its walls, Wright Post, J. Kearny Rogers, Valentine Mott, and Alexander H. Stevens, achieved those surgical triumphs which made the New-York Hospital famous the world over, and sowed seed which ripened into fruit worthy of them.

I will venture to say that no institution in this country has turned out as many able men, or afforded to our profession as much noble teaching and healthful stimulus to labor for the common good.

Where, alas! is she now? Gone—forever gone from the old familiar spot! The noble elms planted by our wise fathers—with the fond hope that they would yield only to disease and decay, incident alike to man and tree—are levelled in the dust, and, with grief and shame be it spoken, no skilful woodman officiated at the sacrifice, but they fell before repeated and bungling blows from the dull axe of the rude navvy.

The gentle eminence on which she sat so proudly has disappeared before the shovel of the inevitable contractor. Streets have been cut through her ample and pleasant grounds. Marble ware-houses, in long and tiresome rows, have risen as if by magic; trade and commerce now sit enthroned on the spot which all had hoped was forever consecrated to charity and good works.

Why this change? Let us examine the record. The Governors of the hospital, in their annual report to the Legislature for 1869, state that poverty was the cause. I will quote their own words:

"The annual State appropriations had ceased, donations and bequests were always uncertain, and had been rendered still more so by a general conviction of that portion of the community sympathizing with the humane objects of the hospital, that the valuable land occupied by the hospital buildings should be made to yield income for the support of the hospital in some other location," etc. They say: "The proceedings of the Board of Governors, for the last ten years, will show that the absorbing theme of discussion and investigation has been to devise means for the permanent increase of revenue, in order to extend the benefits of the hospital to a larger number of the sick and injured; and that the leasing of the lands on Broadway, Worth, Church, and Duane Streets, was finally adopted with reluctance, as the only means adequate to solve the problem. To have continued even the restricted opera-

tions of the hospital, in the face of accumulating indebtedness and increasing demand for gratuitous hospital treatment, with no ascertained or probable source of additional annual income, would have subjected this board to the well-merited censure of your honorable body, and this community."

"Such are the circumstances and motives which controlled the action of the Board of Governors in respect to the old hospital grounds, and in the light of these facts they are willing to be judged."

"The board are sensible of the heavy responsibility that rests upon them to administer their trust judiciously, liberally, and economically, and are confident that their next annual report will make manifest that their sympathies and energy have been successfully devoted to perpetuating and extending the usefulness of the important charity under their charge."

After such a declaration you would very naturally expect that, having leased the grounds and thus secured the "additional annual income," the Board of Governors, who for ten years past have been absorbed in the discussion as to how the benefits of the hospital could be extended to a larger number of the sick and injured, would be up and doing, and that long ere this something worthy of them and the trust they hold would have been at least commenced.

Listen to a plain statement of facts:

The medical board have from the first watched the progress of affairs with great anxiety—have protested against even the temporary suspension of the institution. We have urged upon the governors the necessity for prompt action; have diligently labored to find eligible pieces of property which might be obtained; have found such a location which can be had and which is very desirable, situated as it is on the west side of the town, far removed from any other hospital, and accessible to a district which would furnish ample material to fill its wards. A committee from the Board of Governors was appointed to examine into the matter. The committee was made up of a few men in the board who are for progress, and they reported favorably. The board, however, by a large majority, dismissed the subject, and, in opposition to the report of their own committee and our individual and united pleadings as a medical board, adhered to their original intention. What, think you, is that intention? Listen while I tell it you.

Years ago, when there was no provision in this city for the care of lunatics, except the cold charity of the almshouse, the New-York Hospital spread its sheltering wing over that unfortunate class, and erected a building upon the grounds, where they could be cared for. In time, as the wants of the hospital for the sick and maimed increased and more room

was needed, land was secured at Bloomingdale, buildings erected and the asylum removed to that location—the building formerly used for lunatics being converted into a hospital proper, and devoted to the accommodation of sick and injured seamen, for whose support the State paid a certain sum per head.

The property at Bloomingdale, fronting as it does upon one of the new boulevards, is now immensely valuable, and the board have determined to remove the asylum to White Plains or some other place, and to this they intend to devote all their energies and means. Years hence—for we all know how slowly all such projects are accomplished—when the new asylum shall be completed, they propose to allow the hospital again to come into being and occupy the buildings then vacated at Bloomingdale, far, far away from wharves, factories, railroad stations, and a dense population. In the mean time the hospital sleeps—is dead.

The absolute need of a new asylum is doubted by very many. Since the early days of its usefulness great changes have come to pass. The State has provided and is still engaged in increasing her provision for lunatics; and private enterprise and charity are actively at work here and all over the State multiplying asylums.

By what right, except that of might, do the governors bury the hospital, virtually ignore its usefulness, and devote their funds to buildings and grounds of questionable utility?

Who were the founders of the New-York Hospital? By whose influence was the charter obtained and the funds chiefly raised? In fact, who made the New-York Hospital what it was from the beginning to the time when it lay gasping, dying in Duane Street, now more than a year ago? Doctors!

Its charter was granted by "George III., by the grace of God, of Great Britain, France, and Ireland, King, Defender of the Faith," who "sent greeting to his loving subjects, Peter Middleton, Samuel Bard, and John Jones, physicians, by their humble petition presented unto our trusty and well-beloved Cadwallader Colden, Esq., Lieutenant-Governor, etc."

Through the exertions of Dr. John Fothergill and Sir William Johnson, names eminent in our profession, considerable contributions were obtained in Great Britain.

It was instituted for the benefit of the respectable sick poor of the city of New York, a class too intelligent and not poor enough to be absolute paupers. Let its records show how it has been esteemed by that class, and also the good it has wrought among them.

Nothing is said in the original charter about a lunatic asylum. A hospital for the treatment of disease and surgical

accidents was established and intended to be *perpetual*—the *first* if not the *only* care of the governors.

One great cause of the departure from the straight path of duty and responsibility seems to me to lie in the fact that the profession has no representation in the Board of Governors. I do not believe that the management of the affairs of any hospital can reach the highest point of excellence, except its medical board constitute a part of its board of governors. Let it be a minority, if you please, but still a minority so respectable in numbers as to command attention and secure a fair hearing of what they have to say on all questions in which they from their training and experience have the ripest knowledge.

There seems to be in the minds of all governing boards of hospitals, in this community at least, a certain jealousy of the medical men connected with them. We are treated, to be sure, with a certain *sort* of respect, and our opinions are formally asked, but, except in clear cases of life and death, how often are they accepted? The opinion of an architect on the subject of ventilation and the number of cubic feet of fresh air required by a patient is preferred to ours; and a hireling steward is frequently considered a better judge of fitting food for an invalid.

To what degree this feeling is sometimes carried I will illustrate: A certain old-time and influential governor of one of our hospitals was applied to for aid and counsel in establishing a hospital in the neighboring city of Brooklyn. He gave freely from the stores of his ripe experience, and closed with the following injunction: "Whatever you do, be sure to keep your foot on the necks of the doctors." This should not be so. The medical man who devotes his energies to developing the greatest amount of good to the sufferers within the hospital wards, and who does this without reward of any kind except what comes from a good conscience and the sense of duty done, is certainly entitled to a voice in the management of the institution with which he is connected, and the laymen associated with him would find him at all times an able and earnest coadjutor.

I have heard that it has been said by some who are responsible for the fate of the New-York Hospital, that the doctors are only in a hurry for its reconstruction, that they may have a field for teaching, and thereby glorify themselves. If this were true (all but the glorifying), why should it not be so? It was the intention of the original founders that the hospital should be used as a school in the highest sense of the term, where the student should see disease and accident treated

under the most favorable circumstances and in the best manner known to science. How else are doctors to be made at all fitted to practise their noble art? To whom, think you, would one of these objectors first apply, were he sick or sore? To the man fresh from two courses of lectures, or to one with mind well stored and memory filled with daily hospital experiences?

While the governors stand on the bank of the stream, hesitating whether to venture in or not, I very much fear that the "powers that be" may bring the whole matter before the Legislature, and, on the ground that the trust has not been properly administered, attempt to get the matter into their own hands. As the real estate now held by the board is so valuable, computed as it is by millions of dollars, I shall be much surprised if the "Ring" do not attempt to step in and dispense.

Now, the profession, acting in concert, are strong and can accomplish much, either socially or politically. What I would propose is, that each one of us examine into the merits of this subject and use all his influence to secure the immediate rehabilitation of that hospital of whose record in the past we are all so proud.

The epidemic of small-pox in London continues unabated, the number of deaths per week still averaging nearly two hundred. A significant statement is made by the *Lancet*, which ought to carry conviction to those unbelievers who latterly have found it to their interest to denounce vaccination. It says not a single revaccinated person has been admitted to the small-pox hospital at Homerton, and no death of a vaccinated person has occurred under seventeen years of age. This affords additional evidence of the protective power of vaccination up to the age of puberty, and of the necessity of revaccination about that time.

During the siege of Paris, of course, we received only the provincial medical journals of France. From a package of back numbers of the *Gazette Médicale*, which have just come to hand, we make the few following abstracts:

The Use of Camphor in Hospital Gangrene.—M. Netter, of the Military Hospital of Rennes, has found camphor, in powder, very efficacious in *hospital gangrene*, by sprinkling it abundantly over the wound. In his service as well as in that of M. Aubry, surgeon of the same institution, they had treated

this affection by the usual means—chloride of iron and carbolic acid with alcohol—but without success. By using very freely the powdered camphor, three patients were successfully treated, and in forty-eight hours the disease disappeared from the hospital.

Paralysis of the Diaphragm.—At the October session of the Société de Thérapeutique M. Paul presented some observations upon a case of paralysis of the diaphragm, the patient, a boy, twelve years of age, being under his own care. He was in good health until the 12th of last June, when he took a notion to plunge his feet in cold water and keep them there for five minutes as the weather was very hot. Two hours after he felt an oppression at the xyphoid appendix. This symptom became more and more aggravated until seen by M. Paul six days afterward, when the lad complained constantly of uneasiness at the lower part of the sternum and of difficulty in breathing. He drew long sighs between every three or four respirations, which were labored and unaccompained with the rising and falling of the abdominal walls as in the normal state; indeed, the epigastrium was depressed when the ribs and sternum were elevated. He was then given a book and directed to read aloud, when the difficulty increased. On examining the chest, nothing abnormal was discovered, either by percussion or auscultation. In making a *résumé*, it was easy to arrive at a diagnosis of the affection. The trouble in the respiration was an alteration of the mechanical functions of the thorax.

At the moment of inspiration the movements which show the action of the diaphragm do not exist, such as the raising of the epigastrium and the approaching of the lower ribs, and at the same time the expansion of the chest is that caused by the elevator muscles of the thorax. On the contrary, at each respiration the ribs fall while the depression of the epigastrium disappears. These details are sufficient to demonstrate the absence of all action on the part of the diaphragm as well as to prove that it is not contracted but paralyzed. From the history of the attack the inference is that the origin is rheumatismal.

Treatment.—The negative pole of a galvanic battery was placed in the interval between the sterno-cleido mastoid and the right anterior scalenus muscles and the positive upon the right nipple. Immediately, in response to the current, the respiration became normal, but ceased to be so when after five minutes the current was withdrawn. By the repetition of this remedy, the patient had completely recovered in one month after the accident.

Action of Urine upon the Cellular Tissue.—Arthur Menzel, in the *Lyon Médicale* for March, 1871, gives the result of his experiments, originally reported in the *Wien Medizin. Wochenschrift*, Nos. 81 to 85, 1869, proving that the general opinion that urine is highly pernicious to the tissues, and causes fatal inflammation and gangrene, is entirely erroneous when that fluid is in a healthy condition.

It will be remembered that M. Maisonneuve, in defending his operation for urethrotomy, asserts that the absorption of urine is the sole cause of the fatal result so often following the cutting and rending of the urethra by his instrument, and, to prevent even a drop being taken up, he advises the insertion at once of a catheter, which should be left in contact with the walls for several hours. This statement Profs. Simon and Verneuil deny *in toto*, and in their support we give an abstract of the author's experiments and the conclusions he deduces:

He first experimented with acid urine, injecting a drachm under the skin of a dog, increasing the quantity to an ounce, without any ill effect in several experiments. Next with the tenotomy-knife he separated the skin to the breadth of four inches, and injected eight ounces of human urine, which necessarily became mixed with blood. In one only of four cases was pus even formed, and then it was laudable; in the remainder the blood and urine were absorbed within four days. He repeated these experiments in the ischio-rectal fossa, and in all of the five cases there was no bad result. To test the opinion of Simon that the distention and compression of the tissues under urinous infiltration may cause gangrene, Menzel twice injected urine in the tissues with such force as to raise a tumor of the size of the fœtal head, and then prevented egress of the urine through the wound by a suture, and, although the quantity amounted to about half a pint, it was absorbed within three days.

To these facts he adds the clinical experience of Billroth in nine cases, one of which was a perforation of the urethra by the catheter; in three there was rupture of the urethra by contusion of the perineum, and in the fifth rupture of the canal, by a fragment of bone broken from the pelvis, while the four remaining were cases of rupture of the urethra behind the stricture. There were five recoveries, two of the deaths being in the case of stricture where probably the urine was unhealthy and alkaline.

In view of the different results obtained by experiments on animals and by clinical observation, Menzel carried his researches further by cutting down upon the urethra of a dog, and sewing the wound up again so as to obtain infiltration. A fistula formed at each angle of the wound, but no poisoning

followed. In another case he repeated the same experiment, tying, however, the glans penis so as totally to direct the flow of urine into the wound. The urine flowing into the surrounding tissue formed an immense tumor, which only subsided and disappeared when the glans became gangrenous and separated. A few days after he was cured with a fistule. In several other analogous cases he obtained the same result.

The conclusions he draws are—

1. That normal acid urine possesses no septic properties and never produces gangrene by its chemical properties. 2. Gangrene cannot result from the distention by infiltrated urine. 3. When gangrene occurs, it is either from contusion or by inoculation from an unclean catheter.

He next experimented with alkaline urine and found, when rendered so by the addition of soda or potassa, it proved itself to be innocuous; but urine alkaline by ammoniacal fermentation he found exceedingly poisonous, causing large abscesses and cutaneous gangrene when injected.

Death which succeeds to urinous infiltration is certainly due in part to the products contained in the putrid urine, and to verify this fact Menzel injected putrid urine directly into the blood. The animals so treated evinced all the symptoms of blood-poisoning.

The result of these experiments is easily reconciled with that of the clinics, since it admits of different effects according as the urine is acid or alkaline, and the inference is that infiltration is without danger when the urine is normal and the patient in good health.

At a sitting of the Société de Biologie M. Monod presented some observations made in the case of an old man of seventy-five, dying soon after fracture of the neck of the femur. The lungs were found full of metastatic abscesses, and yet the autopsy showed no wound in any region of the body. In 1867, at the Charité, Lionville saw a similar case; and M. Moreau, of the Maternité, witnessed puerperal fever in a pupil (sage-femme) during an epidemic of that disease, although she was not pregnant at the time.

M. Dumontpallier recollected that, in a discussion that took place at the Académie de Médecine in 1858, there were presented two cases of puerperal fever in pupils (sage-femmes) occurring during the menstrual period. He divined the cause to be the suppurative exfoliation from the uterine mucous membrane, and suggested that in the cases of the old men there might have existed suppurative inflammation of the prostate gland, which often occurs unnoticed in such subjects, and which would account for the purulent affection.

A "judicial blindness" seems to have settled upon the French nation, as is evidenced by the conduct of the people there for nearly a year past. But now the physicians, of whom we had hoped better things, have apparently lost even their common-sense, and, by their frantic efforts to commit the profession to a work of intolerance, have outstripped even the political thimblerigging of their less intelligent and therefore less reprehensible associates the Communists.

At the session of the Paris Academy of Medicine of the 7th of March, M. Behier formally declared that it was not consistent with the dignity of the country to continue any intercourse or relations with the German people, and he therefore gravely moved that the Academy erase from its rolls the names of all its foreign fellows belonging to the North-German Confederacy.

M. Bouley fully sympathized in the feeling of indignation to which M. Behier had given utterance, and with him thought that Prussia had forever disgraced herself in the eyes of the civilized world. But, to his credit be it said, he could not recognize the right of the Academy to abolish a title which was granted for scientific ability and renown; for Science has nothing in common with crime—so much the worse, said he, for those scientists who during the war disgraced themselves by acts unworthy of Science—and the Academy was bound to respect the inalienable right of Science to hold her titles.

M. Verneuil partook of the same righteous indignation, and narrated at length observations which caused him to entertain this feeling. He concluded by asserting that it was the duty of every honest man to completely cease all communication with the Prussians; but, like M. Behier, he thought the Academy had not the right to dismiss its foreign associate members. The title must remain, but no intercourse could be had with the holders thereof.

M. Barth thought that a resolution *ab irato* should not be passed, and suggested that there was another aspect to the question, as several members of the Academy were also honorary members of German scientific societies. For his own

part, he had determined to tender his resignation of the fellowship which he held of a German society, and, whatever decision the Academy might arrive at, he thought she should lose no opportunity of protesting, in the most emphatic manner, against the odious crimes Prussia had been guilty of during the war. (See the *Gazette Hebdomadaire*, March 17, 1871, for the full debate.)

A Practical Lesson in Hygiene.—A correspondent of the *Medical Press and Circular* narrates this instructive fact. The same experience was bought over and over again in our recent war, at a frightful cost of life, and it might have been supposed that the lesson would have been heeded by other nations:

The "Besieged Resident" lately wrote from Paris: The number of wounded in this hotel has considerably diminished, owing to the deaths among them. For the Société Internationale to have made it their central ambulance was a great mistake. Owing to the want of ventilation, the simplest operations are usually fatal. Four out of five of those who have an arm or leg amputated die of pyæmia. Now, as in the American tents four out of five recover, and as French surgeons are as skilful as American surgeons, the average mortality in the two ambulances is a crucial proof of the advantages of the American tent system. Under their tents there is perfect ventilation, and yet the air is not cold. If their plan were universally adopted in hospitals, it is probable that many lives which are now sacrificed to the gases which are generated from operations, and which find no exit from buildings of stone or brick, would be saved. "Our war," said an American surgeon to me the other day, "taught us that a large number of cubic inches of air is not enough for a sick man, but that the air must be perpetually renewed by ventilation."

At last.—The Medical Department of Harvard University has made a very positive advance in the matter of medical education, of which so much has been said and written, but so little done. By a formal vote of the Faculty and Corporation, the lecture-term is advanced to three years, and in each year the studies are taken up in their natural and progressive order. Rigid examinations will be held at the close of each term, and no student will be allowed to attend other than the lectures of his own year and class. Students from other colleges may

enter an advanced class, provided they pass a thorough examination on *all* the studies of the previous years. The studies required are as follows: First year, anatomy, physiology, and general chemistry. Second year, medical chemistry, materia medica, pathological anatomy, theory and practice of medicine, clinical medicine, surgery, and clinical surgery. Third year, pathological anatomy, therapeutics, theory and practice of obstetrics, theory and practice of medicine, clinical medicine, surgery, and clinical surgery.

The immediate effect of this step will, we doubt not, be a reduction in the number of medical students at Harvard, but soon the tide will turn, and when it is seen, as it must inevitably be, that she turns out more accomplished and better-educated physicians, we believe that other colleges will follow in her wake. Harvard is powerful enough to carry through this much-needed reform, and so to force other institutions up to her own level, and we wish her every success and encouragement in the movement. By this deliberate action too, she has shown that the conduct of her medical department is not to be based upon purely commercial and mercenary considerations; but that, in deed as well as in name, she is devoted to the interests of medical education. We agree with the editor of the *Boston Medical and Surgical Journal*, who says that this step marks a new era in the history of American medicine, and gives a value to the medical degree which it has never yet known in this country.

M. Brierre de Boismont, who, as is well known, is the supervising medical officer of the *Maison de Santé* situated in the Faubourg St. Antoine, Paris, has addressed to Dr. Forbes Winslow, of London, a letter giving an account of his asylum during the siege. The letter, which is of remarkable and even exciting interest, is printed in full in the *Lancet* of March 4, 1871. For want of space we quote only the paragraphs relating to the effect of the deprivation and discomforts induced by the siege on the mental condition of the patients:

The mental disorders that occurred during this epoch were characterized, as in 1848, by great exaltation and depression; but the terrible despair that fixed itself on the imagination was much more marked than at the former convulsion. The

insane had two things to contend with, viz., an intensely exalted imagination caused by morbid conditions of the brain, combined with the painful physical and mental sufferings consequent upon defective nourishment, and all the horrors accompanying the siege. What greatly intensified the state of my insane patients was their almost chronic condition of insomnia, the effects of the bombardment. Under these circumstances, it was almost useless for patients to retire to bed, for no continuity of sleep could be obtained. Every evening, at half-past ten, as if the enemy grudged a moment's repose, the bombardment commenced, and lasted without intermission until five o'clock in the morning. My poor patients were very much tormented by it, and great cries issued from a dormitory where thirty or more were huddled together in a state of great mental terror.

The lamentable effects of this war, and particularly of the siege of Paris, will, I fear, not soon pass away. Generations yet to come will be the sufferers from so terrible a calamity. The whole of society appears to be disorganized. Fathers, husbands, and sons, have disappeared most mysteriously from the scene of life. Men of fortune have been ruined, and desolation and despair are everywhere to be met with. I pointed out in the *Union Médicale*, in 1848, the sad effects of political revolutions on the mental health, but the cases then detailed will in amount be insignificant as compared with what this frightful social and political convulsion must eventually give rise to.

As to the effect of the siege on the general mortality of Paris, I will merely state that the death-rate rose from 1,300 to 1,400 (the ordinary weekly average) to 4,670, for this number of persons died in Paris during the last week of the siege.

Puncture in Anasarca.—Dr. Handfield Jones, at a recent meeting of the Clinical Society of London, read a paper on this subject, in which he advocated the making a single puncture in the calves of both legs with a fine trocar, and, after withdrawing the stilettes, leaving the canulas open for several hours, to allow the fluid to drain away. In this manner he succeeded in the first operation in drawing off sixty measured ounces of fluid from the right leg, but only ten from the left, in consequence, he supposed, of the canula not lying properly in the subcutaneous cellular tissue. In a second operation on the same man, three days afterward, he drew off 120 ounces of fluid, besides a great deal which ran from the punctures for several days afterward, sufficient to saturate three blankets. For the performance of the operation, the man was placed in a sitting posture, and this he considered important, as it facilitated the draining away of the fluid.